SEQUENCE LISTING

<110> Lehmann, Martin
Lassen, Soren F

<120> Improved Phytases

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Phe Val Gln Val Leu Ala Arg His Gly Ala Arg Ser Pro Thr His Ser
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Lys Thr Lys Ala Tyr Ala Ala Thr Ile Ala Ala Ile Gln Lys Ser Ala
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Leu Asp Ser Glu Glu Leu Thr Pro Phe Gly Arg Asn Gln Leu Arg Asp
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Leu Gly Ala Gln Phe Tyr Glu Arg Tyr Asn Ala Leu Thr Arg His Ile
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Asn Pro Phe Val Arg Ala Thr Asp Ala Ser Arg Val His Glu Ser Ala
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Glu Lys Phe Val Glu Gly Phe Gln Thr Ala Arg Gln Asp Asp His His
145 150 155 160

Ala Asn Pro His Gln Pro Ser Pro Arg Val Asp Val Ala Ile Pro Glu
165 170 175

Gly Ser Ala Tyr Asn Asn Thr Leu Glu His Ser Leu Cys Thr Ala Phe
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Glu Ser Ser Thr Val Gly Asp Asp Ala Val Ala Asn Phe Thr Ala Val
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Phe Ala Pro Ala Ile Ala Gln Arg Leu Glu Ala Asp Leu Pro Gly Val
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Gln Leu Ser Thr Asp Asp Val Val Asn Leu Met Ala Met Cys Pro Phe
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Glu Thr Val Ser Leu Thr Asp Asp Ala His Thr Leu Ser Pro Phe Cys
245 250 255

Asp Leu Phe Thr Ala Thr Glu Trp Thr Gln Tyr Asn Tyr Leu Leu Ser
260 265 270

Leu Asp Lys Tyr Tyr Gly Tyr Gly Gly Gly Asn Pro Leu Gly Pro Val
275 280 285

Gln Gly Val Gly Trp Ala Asn Glu Leu Met Ala Arg Leu Thr Arg Ala
290 295 300

Pro Val His Asp His Thr Cys Val Asn Asn Thr Leu Asp Ala Ser Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Ser Asn Leu Val Ser Ile Phe Trp Ala Leu Gly Leu Tyr Asn Gly Thr
340 345 350

Ala Pro Leu Ser Gln Thr Ser Val Glu Ser Val Ser Gln Thr Asp Gly
355 360 365

Tyr Ala Ala Ala Trp Thr Val Pro Phe Ala Ala Arg Ala Tyr Val Glu
370 375 380

Met Met Gln Cys Arg Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Met Pro Leu His Gly Cys Pro Thr Asp Lys Leu Gly
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35 40 45

Phe Val Gln Val Leu Ala Arg His Gly Ala Arg Ser Pro Thr Asp Ser
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Lys Thr Lys Ala Tyr Ala Ala Thr Ile Ala Ala Ile Gln Lys Asn Ala
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Thr Ala Leu Pro Gly Lys Tyr Ala Phe Leu Lys Ser Tyr Asn Tyr Ser
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Met Gly Ser Glu Asn Leu Thr Pro Phe Gly Arg Asn Gln Leu Gln Asp
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Leu Gly Ala Gln Phe Tyr Arg Arg Tyr Asp Thr Leu Thr Arg His Ile
115 120 125

Asn Pro Phe Val Arg Ala Ala Asp Ser Ser Arg Val His Glu Ser Ala
130 135 140

Glu Lys Phe Val Glu Gly Phe Gln Asn Ala Arg Gln Gly Asp Pro His
145 150 155 160

Ala Asn Pro His Gln Pro Ser Pro Arg Val Asp Val Val Ile Pro Glu

165 170 175

Gly Thr Ala Tyr Asn Asn Thr Leu Glu His Ser Ile Cys Thr Ala Phe
180 185 190

Glu Ala Ser Thr Val Gly Asp Ala Ala Ala Asp Asn Phe Thr Ala Val
195 200 205

Phe Ala Pro Ala Ile Ala Lys Arg Leu Glu Ala Asp Leu Pro Gly Val
210 215 220

Gln Leu Ser Ala Asp Asp Val Val Asn Leu Met Ala Met Cys Pro Phe
225 230 235 240

Glu Thr Val Ser Leu Thr Asp Asp Ala His Thr Leu Ser Pro Phe Cys
245 250 255

Asp Leu Phe Thr Ala Ala Glu Trp Thr Gln Tyr Asn Tyr Leu Leu Ser
260 265 270

Leu Asp Lys Tyr Tyr Gly Tyr Gly Gly Gly Asn Pro Leu Gly Pro Val
275 280 285

Gln Gly Val Gly Trp Ala Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser
290 295 300

Pro Val His Asp His Thr Cys Val Asn Asn Thr Leu Asp Ala Asn Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Ser Asn Leu Val Ser Ile Phe Trp Ala Leu Gly Leu Tyr Asn Gly Thr
340 345 350

Lys Pro Leu Ser Gln Thr Thr Val Glu Asp Ile Thr Arg Thr Asp Gly
355 360 365

Tyr Ala Ala Ala Trp Thr Val Pro Phe Ala Ala Arg Ala Tyr Ile Glu
370 375 380

Met Met Gln Cys Arg Ala Glu Lys Gln Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Met Pro Leu His Gly Cys Ala Val Asp Asn Leu Gly
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35 40 45

Phe Ala Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Glu Ser
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65 70 75 80

Thr Thr Phe Asp Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser
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100 105 110

Ser Gly Ile Lys Phe Tyr Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile
115 120 125

Ile Pro Phe Ile Arg Ser Ser Gly Ser Ser Arg Val Ile Ala Ser Gly
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg
145 150 155 160

Ala Gln Pro Gly Gln Ser Ser Pro Lys Ile Asp Val Val Ile Ser Glu
165 170 175

Ala Ser Ser Ser Asn Asn Thr Leu Asp Pro Gly Thr Cys Thr Val Phe
180 185 190

Glu Asp Ser Glu Leu Ala Asp Thr Val Glu Ala Asn Phe Thr Ala Thr
195 200 205

Phe Ala Pro Ser Ile Arg Gln Arg Leu Glu Asn Asp Leu Ser Gly Val
210 215 220

Thr Leu Thr Asp Thr Glu Val Thr Tyr Leu Met Asp Met Cys Ser Phe
225 230 235 240

Asp Thr Ile Ser Thr Ser Thr Val Asp Thr Lys Leu Ser Pro Phe Cys
245 250 255

Asp Leu Phe Thr His Asp Glu Trp Ile His Tyr Asp Tyr Leu Gln Ser
260 265 270

Leu Lys Lys Tyr Tyr Gly His Gly Ala Gly Asn Pro Leu Gly Pro Thr
275 280 285

Gln Gly Val Gly Tyr Ala Asn Glu Leu Ile Ala Arg Leu Thr His Ser
290 295 300

Pro Val His Asp Asp Thr Ser Ser Asn His Thr Leu Asp Ser Asn Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ser Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Asn Gly Ile Ile Ser Ile Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr
340 345 350

Lys Pro Leu Ser Thr Thr Thr Val Glu Asn Ile Thr Gln Thr Asp Gly
355 360 365

Phe Ser Ser Ala Trp Thr Val Pro Phe Ala Ser Arg Leu Tyr Val Glu
370 375 380

Met Met Gln Cys Gln Ala Glu Gln Glu Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Pro Ile Asp Ala Leu Gly
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35 40 45

Phe Ala Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Glu Ser
50 55 60

Lys Gly Lys Lys Tyr Ser Ala Leu Ile Glu Glu Ile Gln Gln Asn Val
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Thr Thr Phe Asp Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser
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Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Gln Glu Leu Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile
115 120 125

Ile Pro Phe Ile Arg Ser Ser Gly Ser Ser Arg Val Ile Ala Ser Gly
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg
145 150 155 160

Ala Gln Pro Gly Gln Ser Ser Pro Lys Ile Asp Val Val Ile Ser Glu
165 170 175

Ala Ser Ser Ser Asn Asn Thr Leu Asp Pro Gly Thr Cys Thr Val Phe
180 185 190

Glu Asp Ser Glu Leu Ala Asp Thr Val Glu Ala Asn Phe Thr Ala Thr
195 200 205

Phe Ala Pro Ser Ile Arg Gln Arg Leu Glu Asn Asp Leu Ser Gly Val
210 215 220

Thr Leu Thr Asp Thr Glu Val Thr Tyr Leu Met Asp Met Cys Ser Phe
225 230 235 240

Asp Thr Ile Ser Thr Ser Thr Val Asp Thr Lys Leu Ser Pro Phe Cys
245 250 255

Asp Leu Phe Thr His Asp Glu Trp Ile His Tyr Asp Tyr Leu Arg Ser
260 265 270

Leu Lys Lys Tyr Tyr Gly His Gly Ala Gly Asn Pro Leu Gly Pro Thr
275 280 285

Gln Gly Val Gly Tyr Ala Asn Glu Leu Ile Ala Arg Leu Thr His Ser
290 295 300

Pro Val His Asp Asp Thr Ser Ser Asn His Thr Leu Asp Ser Asn Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ser Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Asn Gly Ile Ile Ser Ile Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr
340 345 350

Lys Pro Leu Ser Thr Thr Thr Val Glu Asn Ile Thr Gln Thr Asp Gly
355 360 365

Phe Ser Ser Ala Trp Thr Val Pro Phe Ala Ser Arg Leu Tyr Val Glu
370 375 380

Met Met Gln Cys Gln Ala Glu Gln Glu Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Pro Ile Asp Ala Leu Gly
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35 40 45

Phe Ala Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Asp Ser
50 55 60

Lys Gly Lys Lys Tyr Ser Ala Leu Ile Glu Glu Ile Gln Gln Asn Ala
65 70 75 80

Thr Thr Phe Asp Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Ser
85 90 95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Gln Glu Leu Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Gln Arg Tyr Glu Ser Leu Thr Arg Asn Ile
115 120 125

Val Pro Phe Ile Arg Ser Ser Gly Ser Ser Arg Val Ile Ala Ser Gly
130 135 140

Lys Lys Phe Ile Glu Gly Phe Gln Ser Thr Lys Leu Lys Asp Pro Arg
145 150 155 160

Ala Gln Pro Gly Gln Ser Ser Pro Lys Ile Asp Val Val Ile Ser Glu
165 170 175

Ala Ser Ser Ser Asn Asn Thr Leu Asp Pro Gly Thr Cys Thr Val Phe
180 185 190

Glu Asp Ser Glu Leu Ala Asp Thr Val Glu Ala Asn Phe Thr Ala Thr
195 200 205

Phe Val Pro Ser Ile Arg Gln Arg Leu Glu Asn Asp Leu Ser Gly Val
210 215 220

Thr Leu Thr Asp Thr Glu Val Thr Tyr Leu Met Asp Met Cys Ser Phe
225 230 235 240

Asp Thr Ile Ser Thr Ser Thr Val Asp Thr Lys Leu Ser Pro Phe Cys
245 250 255

Asp Leu Phe Thr His Asp Glu Trp Ile Asn Tyr Asp Tyr Leu Gln Ser
260 265 270

Leu Lys Lys Tyr Tyr Gly His Gly Ala Gly Asn Pro Leu Gly Pro Thr
275 280 285

Gln Gly Val Gly Tyr Ala Asn Glu Leu Ile Ala Arg Leu Thr His Ser
290 295 300

Pro Val His Asp Asp Thr Ser Ser Asn His Thr Leu Asp Ser Ser Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ser Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Asn Gly Ile Ile Ser Ile Leu Phe Ala Leu Gly Leu Tyr Asn Gly Thr
340 345 350

Lys Pro Leu Ser Thr Thr Thr Val Glu Asn Ile Thr Gln Thr Asp Gly
355 360 365

Phe Ser Ser Ala Trp Thr Val Pro Phe Ala Ser Arg Leu Tyr Val Glu
370 375 380

Met Met Gln Cys Gln Ala Glu Gln Glu Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Pro Val Asp Ala Leu Gly
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35 40 45

Leu Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
50 55 60

Lys Ser Lys Lys Tyr Lys Lys Leu Val Thr Ala Ile Gln Ala Asn Ala
65 70 75 80

Thr Asp Phe Lys Gly Lys Phe Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Phe Gln Gln Ala Lys Leu Ala Asp Pro Gly
100 105 110

Ala Thr Asn Arg Ala Ala Pro Ala Ile Ser Val Ile Ile Pro Glu Ser
115 120 125

Glu Thr Phe Asn Asn Thr Leu Asp His Gly Val Cys Thr Lys Phe Glu
130 135 140

Ala Ser Gln Leu Thr Pro Phe Gly Glu Gln Gln Leu Val Asn Ser Gly
145 150 155 160

Ile Lys Phe Tyr Gln Arg Tyr Lys Ala Leu Ala Arg Ser Val Val Pro
165 170 175

Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Gly Glu Lys
180 185 190

Phe Ile Glu Gly Gly Asp Glu Val Ala Ala Asn Phe Thr Ala Leu Phe
195 200 205

Ala Pro Asp Ile Arg Ala Arg Ala Glu Lys His Leu Pro Gly Val Thr

210 215 220

Leu Thr Asp Glu Asp Val Val Ser Leu Met Asp Met Cys Ser Phe Asp
225 230 235 240

Thr Val Ala Arg Thr Ser Asp Ala Ser Gln Leu Ser Pro Phe Cys Gln
245 250 255

Leu Phe Thr His Asn Glu Trp Lys Lys Tyr Asn Tyr Leu Gln Ser Leu
260 265 270

Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln
275 280 285

Gly Ile Gly Phe Thr Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro
290 295 300

Val Gln Asp His Thr Ser Thr Asn Ser Thr Leu Val Ser Asn Pro Ala
305 310 315 320

Thr Phe Pro Leu Asn Ala Thr Met Tyr Val Asp Phe Ser His Asp Asn
325 330 335

Ser Met Val Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Glu
340 345 350

Pro Leu Ser Arg Thr Ser Val Glu Ser Ala Lys Glu Leu Asp Gly Tyr
355 360 365

Ser Ala Ser Trp Val Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr
370 375 380

Met Gln Cys Lys Ser Glu Lys Glu Pro Leu Val Arg Ala Leu Ile Asn
385 390 395 400

Asp Arg Val Val Pro Leu His Gly Cys Asp Val Asp Lys Leu Gly Arg
405 410 415

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35 40 45

Leu Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
50 55 60

Lys Ser Lys Lys Tyr Lys Lys Leu Val Thr Ala Ile Gln Ala Asn Ala
65 70 75 80

Thr Asp Phe Lys Gly Lys Phe Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Gln Gln Leu Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Gln Arg Tyr Lys Ala Leu Ala Arg Ser Val
115 120 125

Val Pro Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Gly
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Gln Ala Lys Leu Ala Asp Pro Gly
145 150 155 160

Ala Thr Asn Arg Ala Ala Pro Ala Ile Ser Val Ile Ile Pro Glu Ser
165 170 175

Glu Thr Phe Asn Asn Thr Leu Asp His Gly Val Cys Thr Lys Phe Glu
180 185 190

Ala Ser Gln Leu Gly Asp Glu Val Ala Ala Asn Phe Thr Ala Leu Phe
195 200 205

Ala Pro Asp Ile Arg Ala Arg Ala Glu Lys His Leu Pro Gly Val Thr
210 215 220

Leu Thr Asp Glu Asp Val Val Ser Leu Met Asp Met Cys Ser Phe Asp
225 230 235 240

Thr Val Ala Arg Thr Ser Asp Ala Ser Gln Leu Ser Pro Phe Cys Gln
245 250 255

Leu Phe Thr His Asn Glu Trp Lys Lys Tyr Asn Tyr Leu Gln Ser Leu
260 265 270

Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln
275 280 285

Gly Ile Gly Phe Thr Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro
290 295 300

Val Gln Asp His Thr Ser Thr Asn Ser Thr Leu Val Ser Asn Pro Ala
305 310 315 320

Thr Phe Pro Leu Asn Ala Thr Met Tyr Val Asp Phe Ser His Asp Asn
325 330 335

Ser Met Val Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Gly
340 345 350

Pro Leu Ser Arg Thr Ser Val Glu Ser Ala Lys Glu Leu Asp Gly Tyr
355 360 365

Ser Ala Ser Trp Val Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr
370 375 380

Met Gln Cys Lys Ser Glu Lys Glu Pro Leu Val Arg Ala Leu Ile Asn
385 390 395 400

Asp Arg Val Val Pro Leu His Gly Cys Asp Val Asp Lys Leu Gly Arg
405 410 415

Cys Lys Leu Asn Asp Phe Val Lys Gly Leu Ser Trp Ala Arg Ser Gly
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Gly Asn Trp Gly Glu Cys Phe Ser
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35 40 45

Leu Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
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Lys Ser Lys Lys Tyr Lys Lys Leu Val Thr Ala Ile Gln Ala Asn Ala
65 70 75 80

Thr Asp Phe Lys Gly Lys Phe Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Gln Gln Leu Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Gln Arg Tyr Lys Ala Leu Ala Arg Ser Val
115 120 125

Val Pro Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Gly
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Gln Ala Lys Leu Ala Asp Pro Gly
145 150 155 160

Ala Thr Asn Arg Ala Ala Pro Ala Ile Ser Val Ile Ile Pro Glu Ser
165 170 175

Glu Thr Phe Asn Asn Thr Leu Asp His Gly Val Cys Thr Lys Phe Glu
180 185 190

Ala Ser Gln Leu Gly Asp Glu Val Ala Ala Asn Phe Thr Ala Leu Phe
195 200 205

Ala Pro Asp Ile Arg Ala Arg Ala Glu Lys His Leu Pro Gly Val Thr
210 215 220

Leu Thr Asp Glu Asp Val Val Ser Leu Met Asp Met Cys Ser Phe Asp
225 230 235 240

Thr Val Ala Arg Thr Ser Asp Ala Ser Gln Leu Ser Pro Phe Cys Gln
245 250 255

Leu Phe Thr His Asn Glu Trp Lys Lys Tyr Asn Tyr Leu Gln Ser Leu
260 265 270

Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln
275 280 285

Gly Ile Gly Phe Thr Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro
290 295 300

Val Gln Asp His Thr Ser Thr Asn Ser Thr Leu Val Ser Asn Pro Ala
305 310 315 320

Thr Phe Pro Leu Asn Ala Thr Met Tyr Val Asp Phe Ser His Asp Asn
325 330 335

Ser Met Val Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Glu
340 345 350

Pro Leu Ser Arg Thr Ser Val Glu Ser Ala Lys Glu Leu Asp Gly Tyr
355 360 365

Ser Ala Ser Trp Val Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr
370 375 380

Met Gln Cys Lys Ser Glu Lys Glu Ser Leu Val Arg Ala Leu Ile Asn
385 390 395 400

Asp Arg Val Val Pro Leu His Gly Cys Asp Val Asp Lys Leu Gly Arg
405 410 415

Cys Lys Leu Asn Asp Phe Val Lys Gly Leu Ser Trp Ala Arg Ser Gly
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Gly Asn Trp Gly Glu Cys Phe Ser
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35 40 45

Leu Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
50 55 60

Lys Ser Lys Lys Tyr Lys Lys Leu Val Thr Ala Ile Gln Ala Asn Ala
65 70 75 80

Thr Asp Phe Lys Gly Lys Phe Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Thr Ala Phe Gly Glu Gln Gln Leu Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Gln Arg Tyr Lys Ala Leu Ala Arg Ser Val
115 120 125

Val Pro Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Gly
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Gln Ala Lys Leu Ala Asp Pro Gly
145 150 155 160

Ala Thr Asn Arg Ala Ala Pro Ala Ile Ser Val Ile Ile Pro Glu Ser
165 170 175

Glu Thr Phe Asn Asn Thr Leu Asp His Gly Val Cys Thr Lys Phe Glu
180 185 190

Ala Ser Gln Leu Gly Asp Glu Val Ala Ala Asn Phe Thr Ala Leu Phe
195 200 205

Ala Pro Asp Ile Arg Ala Arg Ala Lys Lys His Leu Pro Gly Val Thr
210 215 220

Leu Thr Asp Glu Asp Val Val Ser Leu Met Asp Met Cys Ser Phe Asp
225 230 235 240

Thr Val Ala Arg Thr Ser Asp Ala Ser Gln Leu Ser Pro Phe Cys Gln
245 250 255

Leu Phe Thr His Asn Glu Trp Lys Lys Tyr Asn Tyr Leu Gln Ser Leu
260 265 270

Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln
275 280 285

Gly Ile Gly Phe Thr Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro
290 295 300

Val Gln Asp His Thr Ser Thr Asn Ser Thr Leu Val Ser Asn Pro Ala
305 310 315 320

Thr Phe Pro Leu Asn Ala Thr Met Tyr Val Asp Phe Ser His Asp Asn
325 330 335

Ser Met Val Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Glu
340 345 350

Pro Leu Ser Arg Thr Ser Val Glu Ser Ala Lys Glu Leu Asp Gly Tyr
355 360 365

Ser Ala Ser Trp Val Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr
370 375 380

Met Gln Cys Lys Ser Glu Lys Glu Pro Leu Val Arg Ala Leu Ile Asn
385 390 395 400

Asp Arg Val Val Pro Leu His Gly Cys Asp Val Asp Lys Leu Gly Arg
405 410 415

Cys Lys Leu Asn Asp Phe Val Lys Gly Leu Ser Trp Ala Arg Ser Gly
420 425 430

Gly Asn Trp Gly Glu Cys Phe Ser
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Asp Glu Leu Ser Val Ser Ser Asp Leu Pro Lys Asp Cys Arg Val Thr
35 40 45

Phe Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ala Ser
50 55 60

Lys Ser Lys Lys Tyr Lys Lys Leu Val Thr Ala Ile Gln Lys Asn Ala
65 70 75 80

Thr Glu Phe Lys Gly Lys Phe Ala Phe Leu Glu Thr Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Gln Gln Met Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Gln Lys Tyr Lys Ala Leu Ala Gly Ser Val
115 120 125

Val Pro Phe Ile Arg Ser Ser Gly Ser Asp Arg Val Ile Ala Ser Gly
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Gln Ala Asn Val Ala Asp Pro Gly
145 150 155 160

Ala Thr Asn Arg Ala Ala Pro Val Ile Ser Val Ile Ile Pro Glu Ser
165 170 175

Glu Thr Tyr Asn Asn Thr Leu Asp His Ser Val Cys Thr Asn Phe Glu
180 185 190

Ala Ser Glu Leu Gly Asp Glu Val Glu Ala Asn Phe Thr Ala Leu Phe
195 200 205

Ala Pro Ala Ile Arg Ala Arg Ile Glu Lys His Leu Pro Gly Val Gln
210 215 220

Leu Thr Asp Asp Asp Val Val Ser Leu Met Asp Met Cys Ser Phe Asp
225 230 235 240

Thr Val Ala Arg Thr Ala Asp Ala Ser Glu Leu Ser Pro Phe Cys Ala
245 250 255

Ile Phe Thr His Asn Glu Trp Lys Lys Tyr Asp Tyr Leu Gln Ser Leu

260 265 270

Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln
275 280 285

Gly Ile Gly Phe Thr Asn Glu Leu Ile Ala Arg Leu Thr Asn Ser Pro
290 295 300

Val Gln Asp His Thr Ser Thr Asn Ser Thr Leu Asp Ser Asp Pro Ala
305 310 315 320

Thr Phe Pro Leu Asn Ala Thr Ile Tyr Val Asp Phe Ser His Asp Asn
325 330 335

Gly Met Ile Pro Ile Phe Phe Ala Met Gly Leu Tyr Asn Gly Thr Glu
340 345 350

Pro Leu Ser Gln Thr Ser Glu Glu Ser Thr Lys Glu Ser Asn Gly Tyr
355 360 365

Ser Ala Ser Trp Ala Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr
370 375 380

Met Gln Cys Lys Ser Glu Lys Glu Pro Leu Val Arg Ala Leu Ile Asn
385 390 395 400

Asp Arg Val Val Pro Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg
405 410 415

Cys Lys Leu Lys Asp Phe Val Lys Gly Leu Ser Trp Ala Arg Ser Gly
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Gly Asn Ser Glu Gln Ser Phe Ser
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Gln Asn His Ser Cys Asn Thr Ala Asp Gly Gly Tyr Gln Cys Phe Pro
1 5 10 15

Asn Val Ser His Val Trp Gly Gln Tyr Ser Pro Tyr Phe Ser Ile Glu
20 25 30

Gln Glu Ser Ala Ile Ser Glu Asp Val Pro His Gly Cys Glu Val Thr
35 40 45

Phe Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Glu Ser
50 55 60

Lys Ser Lys Ala Tyr Ser Gly Leu Ile Glu Ala Ile Gln Lys Asn Ala
65 70 75 80

Thr Ser Phe Trp Gly Gln Tyr Ala Phe Leu Glu Ser Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Thr Ile Phe Gly Glu Asn Gln Met Val Asp
100 105 110

Ser Gly Ala Lys Phe Tyr Arg Arg Tyr Lys Asn Leu Ala Arg Lys Asn
115 120 125

Thr Pro Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Val Ala Ser Ala
130 135 140

Glu Lys Phe Ile Asn Gly Phe Arg Lys Ala Gln Leu His Asp His Gly
145 150 155 160

Ser Gly Gln Ala Thr Pro Val Val Asn Val Ile Ile Pro Glu Ile Asp
165 170 175

Gly Phe Asn Asn Thr Leu Asp His Ser Thr Cys Val Ser Phe Glu Asn
180 185 190

Asp Glu Arg Ala Asp Glu Ile Glu Ala Asn Phe Thr Ala Ile Met Gly
195 200 205

Pro Pro Ile Arg Lys Arg Leu Glu Asn Asp Leu Pro Gly Ile Lys Leu
210 215 220

Thr Asn Glu Asn Val Ile Tyr Leu Met Asp Met Cys Ser Phe Asp Thr
225 230 235 240

Met Ala Arg Thr Ala His Gly Thr Glu Leu Ser Pro Phe Cys Ala Ile
245 250 255

Phe Thr Glu Lys Glu Trp Leu Gln Tyr Asp Tyr Leu Gln Ser Leu Ser
260 265 270

Lys Tyr Tyr Gly Tyr Gly Ala Gly Ser Pro Leu Gly Pro Ala Gln Gly
275 280 285

Ile Gly Phe Thr Asn Glu Leu Ile Ala Arg Leu Thr Gln Ser Pro Val
290 295 300

Gln Asp Asn Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr
305 310 315 320

Phe Pro Leu Asp Arg Lys Leu Tyr Ala Asp Phe Ser His Asp Asn Ser
325 330 335

Met Ile Ser Ile Phe Phe Ala Met Gly Leu Tyr Asn Gly Thr Gln Pro
340 345 350

Leu Ser Met Asp Ser Val Glu Ser Ile Gln Glu Met Asp Gly Tyr Ala
355 360 365

Ala Ser Trp Thr Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Leu Met
370 375 380

Gln Cys Glu Lys Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg
385 390 395 400

Val Val Pro Leu His Gly Cys Ala Val Asp Lys Phe Gly Arg Cys Thr
405 410 415

Leu Asp Asp Trp Val Glu Gly Leu Asn Phe Ala Arg Ser Gly Gly Asn
420 425 430

Trp Lys Thr Cys Phe Thr Leu
435

<210> 12
<211> 443
<212> PRT
<213> Talaromyces Thermophilus

<400> 12

Asp Ser His Ser Cys Asn Thr Val Glu Gly Gly Tyr Gln Cys Arg Pro
1 5 10 15

Glu Ile Ser His Ser Trp Gly Gln Tyr Ser Pro Phe Phe Ser Leu Ala
20 25 30

Asp Gln Ser Glu Ile Ser Pro Asp Val Pro Gln Asn Cys Lys Ile Thr
35 40 45

Phe Val Gln Leu Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
50 55 60

Lys Thr Glu Leu Tyr Ser Gln Leu Ile Ser Arg Ile Gln Lys Thr Ala
65 70 75 80

Thr Ala Tyr Lys Gly Tyr Tyr Ala Phe Leu Lys Asp Tyr Arg Tyr Gln
85 90 95

Leu Gly Ala Asn Asp Leu Thr Pro Phe Gly Glu Asn Gln Met Ile Gln
100 105 110

Leu Gly Ile Lys Phe Tyr Asn His Tyr Lys Ser Leu Ala Arg Asn Ala
115 120 125

Val Pro Phe Val Arg Cys Ser Gly Ser Asp Arg Val Ile Ala Ser Gly
130 135 140

Arg Leu Phe Ile Glu Gly Phe Gln Ser Ala Lys Val Leu Asp Pro His
145 150 155 160

Ser Asp Lys His Asp Ala Pro Pro Thr Ile Asn Val Ile Ile Glu Glu
165 170 175

Gly Pro Ser Tyr Asn Asn Thr Leu Asp Thr Gly Ser Cys Pro Val Phe
180 185 190

Glu Asp Ser Ser Gly Gly His Asp Ala Gln Glu Lys Phe Ala Lys Gln
195 200 205

Phe Ala Pro Ala Ile Leu Glu Lys Ile Lys Asp His Leu Pro Gly Val
210 215 220

Asp Leu Ala Val Ser Asp Val Pro Tyr Leu Met Asp Leu Cys Pro Phe
225 230 235 240

Glu Thr Leu Ala Arg Asn His Thr Asp Thr Leu Ser Pro Phe Cys Ala
245 250 255

Leu Ser Thr Gln Glu Glu Trp Gln Ala Tyr Asp Tyr Tyr Gln Ser Leu
260 265 270

Gly Lys Tyr Tyr Gly Asn Gly Gly Gly Asn Pro Leu Gly Pro Ala Gln
275 280 285

Gly Val Gly Phe Val Asn Glu Leu Ile Ala Arg Met Thr His Ser Pro
290 295 300

Val Gln Asp Tyr Thr Thr Val Asn His Thr Leu Asp Ser Asn Pro Ala
305 310 315 320

Thr Phe Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn
325 330 335

Thr Met Thr Ser Ile Phe Ala Ala Leu Gly Leu Tyr Asn Gly Thr Ala
340 345 350

Lys Leu Ser Thr Thr Glu Ile Lys Ser Ile Glu Glu Thr Asp Gly Tyr
355 360 365

Ser Ala Ala Trp Thr Val Pro Phe Gly Gly Arg Ala Tyr Ile Glu Met
370 375 380

Met Gln Cys Asp Asp Ser Asp Glu Pro Val Val Arg Val Leu Val Asn
385 390 395 400

Asp Arg Val Val Pro Leu His Gly Cys Glu Val Asp Ser Leu Gly Arg
405 410 415

Cys Lys Arg Asp Asp Phe Val Arg Gly Leu Ser Phe Ala Arg Gln Gly
420 425 430

Gly Asn Trp Glu Gly Cys Tyr Ala Ala Ser Glu
435 440

<210> 13
<211> 466
<212> PRT
<213> Myceliophthora thermophila

<400> 13

Glu Ser Arg Pro Cys Asp Thr Pro Asp Leu Gly Phe Gln Cys Gly Thr
1 5 10 15

Ala Ile Ser His Phe Trp Gly Gln Tyr Ser Pro Tyr Phe Ser Val Pro
20 25 30

Ser Glu Leu Asp Ala Ser Ile Pro Asp Asp Cys Glu Val Thr Phe Ala
35 40 45

Gln Val Leu Ser Arg His Gly Ala Arg Ala Pro Thr Leu Lys Arg Ala

50 55 60

Ala Ser Tyr Val Asp Leu Ile Asp Arg Ile His His Gly Ala Ile Ser
65 70 75 80

Tyr Gly Pro Gly Tyr Glu Phe Leu Arg Thr Tyr Asp Tyr Thr Leu Gly
85 90 95

Ala Asp Glu Leu Thr Arg Thr Gly Gln Gln Gln Met Val Asn Ser Gly
100 105 110

Ile Lys Phe Tyr Arg Arg Tyr Arg Ala Leu Ala Arg Lys Ser Ile Pro
115 120 125

Phe Val Arg Thr Ala Gly Gln Asp Arg Val Val His Ser Ala Glu Asn
130 135 140

Phe Thr Gln Gly Phe His Ser Ala Leu Leu Ala Asp Arg Gly Ser Thr
145 150 155 160

Val Arg Pro Thr Leu Pro Tyr Asp Met Val Val Ile Pro Glu Thr Ala
165 170 175

Gly Ala Asn Asn Thr Leu His Asn Asp Leu Cys Thr Ala Phe Glu Glu
180 185 190

Gly Pro Tyr Ser Thr Ile Gly Asp Asp Ala Gln Asp Thr Tyr Leu Ser
195 200 205

Thr Phe Ala Gly Pro Ile Thr Ala Arg Val Asn Ala Asn Leu Pro Gly
210 215 220

Ala Asn Leu Thr Asp Ala Asp Thr Val Ala Leu Met Asp Leu Cys Pro
225 230 235 240

Phe Glu Thr Val Ala Ser Ser Ser Ser Asp Pro Ala Thr Ala Asp Ala
245 250 255

Gly Gly Gly Asn Gly Arg Pro Leu Ser Pro Phe Cys Arg Leu Phe Ser
260 265 270

Glu Ser Glu Trp Arg Ala Tyr Asp Tyr Leu Gln Ser Val Gly Lys Trp
275 280 285

Tyr Gly Tyr Gly Pro Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly
290 295 300

Phe Val Asn Glu Leu Leu Ala Arg Leu Ala Gly Val Pro Val Arg Asp
305 310 315 320

Gly Thr Ser Thr Asn Arg Thr Leu Asp Gly Asp Pro Arg Thr Phe Pro
325 330 335

Leu Gly Arg Pro Leu Tyr Ala Asp Phe Ser His Asp Asn Asp Met Met
340 345 350

Gly Val Leu Gly Ala Leu Gly Ala Tyr Asp Gly Val Pro Pro Leu Asp
355 360 365

Lys Thr Ala Arg Arg Asp Pro Glu Glu Leu Gly Gly Tyr Ala Ala Ser
370 375 380

Trp Ala Val Pro Phe Ala Ala Arg Ile Tyr Val Glu Lys Met Arg Cys
385 390 395 400

Ser Gly Gly Gly Gly Gly Gly Gly Gly Gly Glu Gly Arg Gln Glu Lys
405 410 415

Asp Glu Glu Met Val Arg Val Leu Val Asn Asp Arg Val Met Thr Leu
420 425 430

Lys Gly Cys Gly Ala Asp Glu Arg Gly Met Cys Thr Leu Glu Arg Phe
435 440 445

Ile Glu Ser Met Ala Phe Ala Arg Gly Asn Gly Lys Trp Asp Leu Cys
450 455 460

Phe Ala
465

<210> 14
<211> 441
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 14

Asn Ser His Ser Cys Asp Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro
1 5 10 15

Glu Ile Ser His Leu Trp Gly Gln Tyr Ser Pro Tyr Phe Ser Leu Glu

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                20                  25                  30

Asp Glu Ser Ala Ile Ser Pro Asp Val Pro Asp Asp Cys Arg Val Thr
        35                  40                  45

Phe Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
    50                  55                  60

Lys Ser Lys Ala Tyr Ser Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala
65                  70                  75                  80

Thr Ala Phe Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
                85                  90                  95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Asn Gln Met Val Asn
            100                 105                 110

Ser Gly Ile Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile
        115                 120                 125

Val Pro Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Ala
    130                 135                 140

Glu Lys Phe Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly
145                 150                 155                 160

Ser Gln Pro His Gln Ala Ser Pro Val Ile Asp Val Ile Ile Pro Glu
                165                 170                 175

Gly Ser Gly Tyr Asn Asn Thr Leu Asp His Gly Thr Cys Thr Ala Phe
            180                 185                 190

Glu Asp Ser Glu Leu Gly Asp Asp Val Glu Ala Asn Phe Thr Ala Leu
        195                 200                 205

Phe Ala Pro Ala Ile Arg Ala Arg Leu Glu Ala Asp Leu Pro Gly Val
    210                 215                 220

Thr Leu Thr Asp Glu Asp Val Val Tyr Leu Met Asp Met Cys Pro Phe
225                 230                 235                 240

Glu Thr Val Ala Arg Thr Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys
                245                 250                 255

Ala Leu Phe Thr His Asp Glu Trp Arg Gln Tyr Asp Tyr Leu Gln Ser
            260                 265                 270
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Leu Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala
275 280 285

Gln Gly Val Gly Phe Ala Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser
290 295 300

Pro Val Gln Asp His Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Asn Ser Met Ile Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr
340 345 350

Ala Pro Leu Ser Thr Thr Ser Val Glu Ser Ile Glu Glu Thr Asp Gly
355 360 365

Tyr Ser Ala Ser Trp Thr Val Pro Phe Gly Ala Arg Ala Tyr Val Glu
370 375 380

Met Met Gln Cys Gln Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Ala Val Asp Lys Leu Gly
405 410 415

Arg Cys Lys Arg Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser
420 425 430

Gly Gly Asn Trp Ala Glu Cys Phe Ala
435 440

<210> 15
<211> 1426
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (12)..(1412)
<223>

<220>

<221> sig_peptide
<222> (12)..(89)
<223>

<220>
<221> mat_peptide
<222> (90)..()
<223>

<400> 15

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tatatgaatt c atg ggc gtg ttc gtc gtg cta ctg tcc att gcc acc ttg      50
             Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu
                 -25                 -20                 -15

ttc ggt tcc aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac      98
Phe Gly Ser Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His
            -10                 -5                  -1  1

tct tgt gac act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct     146
Ser Cys Asp Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser
    5                   10                  15

cac ttg tgg ggt caa tac tct cca tac ttc tct ttg gaa gac gaa tct     194
His Leu Trp Gly Gln Tyr Ser Pro Tyr Phe Ser Leu Glu Asp Glu Ser
20                  25                  30                  35

gct att tct cca gac gtt cca gac gac tgt aga gtt act ttc gtt caa     242
Ala Ile Ser Pro Asp Val Pro Asp Asp Cys Arg Val Thr Phe Val Gln
                40                  45                  50

gtt ttg tct aga cac ggt gct aga tac cca act tct tct aag tct aag     290
Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys
            55                  60                  65

gct tac tct gct ttg att gaa gct att caa aag aac gct act gct ttc     338
Ala Tyr Ser Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe
        70                  75                  80

aag ggt aag tac gct ttc ttg aag act tac aac tac act ttg ggt gct     386
Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala
    85                  90                  95

gac gac ttg act cca ttc ggt gaa aac caa atg gtt aac tct ggt att     434
Asp Asp Leu Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile
100                 105                 110                 115

aag ttc tac aga aga tac aag gct ttg gct aga aag att gtt cca ttc     482
Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe
                120                 125                 130

att aga gct tct ggt tct gac aga gtt att gct tct gct gaa aag ttc     530
Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe
            135                 140                 145

att gaa ggt ttc caa tct gct aag ttg gct gac cca ggt tct caa cca     578
Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro
        150                 155                 160

cac caa gct tct cca gtt att gac gtt att att cca gaa gga tcc ggt     626
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His Gln Ala Ser Pro Val Ile Asp Val Ile Ile Pro Glu Gly Ser Gly
    165                 170                 175

tac aac aac act ttg gac cac ggt act tgt act gct ttc gaa gac tct      674
Tyr Asn Asn Thr Leu Asp His Gly Thr Cys Thr Ala Phe Glu Asp Ser
180                 185                 190                 195

gaa ttg ggt gac gac gtt gaa gct aac ttc act gct ttg ttc gct cca      722
Glu Leu Gly Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro
                200                 205                 210

gct att aga gct aga ttg gaa gct gac ttg cca ggt gtt act ttg act      770
Ala Ile Arg Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr
            215                 220                 225

gac gaa gac gtt gtt tac ttg atg gac atg tgt cca ttc gaa act gtt      818
Asp Glu Asp Val Val Tyr Leu Met Asp Met Cys Pro Phe Glu Thr Val
        230                 235                 240

gct aga act tct gac gct act gaa ttg tct cca ttc tgt gct ttg ttc      866
Ala Arg Thr Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe
    245                 250                 255

act cac gac gaa tgg aga caa tac gac tac ttg caa tct ttg ggt aag      914
Thr His Asp Glu Trp Arg Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys
260                 265                 270                 275

tac tac ggt tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt      962
Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val
                280                 285                 290

ggt ttc gct aac gaa ttg att gct aga ttg act aga tct cca gtt caa     1010
Gly Phe Ala Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln
            295                 300                 305

gac cac act tct act aac cac act ttg gac tct aac cca gct act ttc     1058
Asp His Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe
        310                 315                 320

cca ttg aac gct act ttg tac gct gac ttc tct cac gac aac tct atg     1106
Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Ser Met
    325                 330                 335

att tct att ttc ttc gct ttg ggt ttg tac aac ggt act gct cca ttg     1154
Ile Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Ala Pro Leu
340                 345                 350                 355

tct act act tct gtt gaa tct att gaa gaa act gac ggt tac tct gct     1202
Ser Thr Thr Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala
                360                 365                 370

tct tgg act gtt cca ttc ggt gct aga gct tac gtt gaa atg atg caa     1250
Ser Trp Thr Val Pro Phe Gly Ala Arg Ala Tyr Val Glu Met Met Gln
            375                 380                 385

tgt caa gct gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga     1298
Cys Gln Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg
        390                 395                 400

gtt gtt cca ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag     1346
Val Val Pro Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys
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405 410 415

aga gac gac ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac 1394
Arg Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn
420 425 430 435

tgg gct gaa tgt ttc gct taagaattca tata 1426
Trp Ala Glu Cys Phe Ala
440

<210> 16
<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 16

Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
-25 -20 -15

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10 -5 -1 1 5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10 15 20

Gly Gln Tyr Ser Pro Tyr Phe Ser Leu Glu Asp Glu Ser Ala Ile Ser
25 30 35

Pro Asp Val Pro Asp Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
40 45 50

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Ala Tyr Ser
55 60 65 70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
75 80 85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90 95 100

Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
105 110 115

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
120 125 130

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135 140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
155 160 165

Ser Pro Val Ile Asp Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
170 175 180

Thr Leu Asp His Gly Thr Cys Thr Ala Phe Glu Asp Ser Glu Leu Gly
185 190 195

Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
200 205 210

Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
215 220 225 230

Val Val Tyr Leu Met Asp Met Cys Pro Phe Glu Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250 255 260

Glu Trp Arg Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
265 270 275

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
280 285 290

Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln Asp His Thr
295 300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Ser Met Ile Ser Ile
330 335 340

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Ala Pro Leu Ser Thr Thr
345 350 355

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
360 365 370

Val Pro Phe Gly Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala

375 380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
425 430 435

Cys Phe Ala
440

<210> 17
<211> 422
<212> PRT
<213> Paxillus involutus phyA1

<400> 17

Ser Val Pro Lys Asn Thr Ala Pro Thr Phe Pro Ile Pro Glu Ser Glu
1 5 10 15

Gln Arg Asn Trp Ser Pro Tyr Ser Pro Tyr Phe Pro Leu Ala Glu Tyr
20 25 30

Lys Ala Pro Pro Ala Gly Cys Gln Ile Asn Gln Val Asn Ile Ile Gln
35 40 45

Arg His Gly Ala Arg Phe Pro Thr Ser Gly Ala Thr Thr Arg Ile Lys
50 55 60

Ala Gly Leu Thr Lys Leu Gln Gly Val Gln Asn Phe Thr Asp Ala Lys
65 70 75 80

Phe Asn Phe Ile Lys Ser Phe Lys Tyr Asp Leu Gly Asn Ser Asp Leu
85 90 95

Val Pro Phe Gly Ala Ala Gln Ser Phe Asp Ala Gly Gln Glu Ala Phe
100 105 110

Ala Arg Tyr Ser Lys Leu Val Ser Lys Asn Asn Leu Pro Phe Ile Arg
115 120 125

Ala Asp Gly Ser Asp Arg Val Val Asp Ser Ala Thr Asn Trp Thr Ala
130 135 140

Gly Phe Ala Ser Ala Ser His Asn Thr Val Gln Pro Lys Leu Asn Leu
145 150 155 160

Ile Leu Pro Gln Thr Gly Asn Asp Thr Leu Glu Asp Asn Met Cys Pro
165 170 175

Ala Ala Gly Asp Ser Asp Pro Gln Val Asn Ala Trp Leu Ala Val Ala
180 185 190

Phe Pro Ser Ile Thr Ala Arg Leu Asn Ala Ala Ala Pro Ser Val Asn
195 200 205

Leu Thr Asp Thr Asp Ala Phe Asn Leu Val Ser Leu Cys Ala Phe Leu
210 215 220

Thr Val Ser Lys Glu Lys Lys Ser Asp Phe Cys Thr Leu Phe Glu Gly
225 230 235 240

Ile Pro Gly Ser Phe Glu Ala Phe Ala Tyr Gly Gly Asp Leu Asp Lys
245 250 255

Phe Tyr Gly Thr Gly Tyr Gly Gln Glu Leu Gly Pro Val Gln Gly Val
260 265 270

Gly Tyr Val Asn Glu Leu Ile Ala Arg Leu Thr Asn Ser Ala Val Arg
275 280 285

Asp Asn Thr Gln Thr Asn Arg Thr Leu Asp Ala Ser Pro Val Thr Phe
290 295 300

Pro Leu Asn Lys Thr Phe Tyr Ala Asp Phe Ser His Asp Asn Leu Met
305 310 315 320

Val Ala Val Phe Ser Ala Met Gly Leu Phe Arg Gln Pro Ala Pro Leu
325 330 335

Ser Thr Ser Val Pro Asn Pro Trp Arg Thr Trp Arg Thr Ser Ser Leu
340 345 350

Val Pro Phe Ser Gly Arg Met Val Val Glu Arg Leu Ser Cys Phe Gly
355 360 365

Thr Thr Lys Val Arg Val Leu Val Gln Asp Gln Val Gln Pro Leu Glu
370 375 380

Phe Cys Gly Gly Asp Arg Asn Gly Leu Cys Thr Leu Ala Lys Phe Val
385 390 395 400

Glu Ser Gln Thr Phe Ala Arg Ser Asp Gly Ala Gly Asp Phe Glu Lys
405 410 415

Cys Phe Ala Thr Ser Ala
420

<210> 18
<211> 422
<212> PRT
<213> Paxillus involutus phyA2

<400> 18

Ser Val Pro Arg Asn Ile Ala Pro Lys Phe Ser Ile Pro Glu Ser Glu
1 5 10 15

Gln Arg Asn Trp Ser Pro Tyr Ser Pro Tyr Phe Pro Leu Ala Glu Tyr
20 25 30

Lys Ala Pro Pro Ala Gly Cys Glu Ile Asn Gln Val Asn Ile Ile Gln
35 40 45

Arg His Gly Ala Arg Phe Pro Thr Ser Gly Ala Ala Thr Arg Ile Lys
50 55 60

Ala Gly Leu Ser Lys Leu Gln Ser Val Gln Asn Phe Thr Asp Pro Lys
65 70 75 80

Phe Asp Phe Ile Lys Ser Phe Thr Tyr Asp Leu Gly Thr Ser Asp Leu
85 90 95

Val Pro Phe Gly Ala Ala Gln Ser Phe Asp Ala Gly Leu Glu Val Phe
100 105 110

Ala Arg Tyr Ser Lys Leu Val Ser Ser Asp Asn Leu Pro Phe Ile Arg
115 120 125

Ser Asp Gly Ser Asp Arg Val Val Asp Thr Ala Thr Asn Trp Thr Ala
130 135 140

Gly Phe Ala Ser Ala Ser Arg Asn Ala Ile Gln Pro Lys Leu Asp Leu
145 150 155 160

Ile Leu Pro Gln Thr Gly Asn Asp Thr Leu Glu Asp Asn Met Cys Pro
165 170 175

Ala Ala Gly Glu Ser Asp Pro Gln Val Asp Ala Trp Leu Ala Ser Ala
180 185 190

Phe Pro Ser Val Thr Ala Gln Leu Asn Ala Ala Ala Pro Gly Ala Asn
195 200 205

Leu Thr Asp Ala Asp Ala Phe Asn Leu Val Ser Leu Cys Pro Phe Met
210 215 220

Thr Val Ser Lys Glu Gln Lys Ser Asp Phe Cys Thr Leu Phe Glu Gly
225 230 235 240

Ile Pro Gly Ser Phe Glu Ala Phe Ala Tyr Ala Gly Asp Leu Asp Lys
245 250 255

Phe Tyr Gly Thr Gly Tyr Gly Gln Ala Leu Gly Pro Val Gln Gly Val
260 265 270

Gly Tyr Ile Asn Glu Leu Leu Ala Arg Leu Thr Asn Ser Ala Val Asn
275 280 285

Asp Asn Thr Gln Thr Asn Arg Thr Leu Asp Ala Ala Pro Asp Thr Phe
290 295 300

Pro Leu Asn Lys Thr Met Tyr Ala Asp Phe Ser His Asp Asn Leu Met
305 310 315 320

Val Ala Val Phe Ser Ala Met Gly Leu Phe Arg Gln Ser Ala Pro Leu
325 330 335

Ser Thr Ser Thr Pro Asp Pro Asn Arg Thr Trp Leu Thr Ser Ser Val
340 345 350

Val Pro Phe Ser Ala Arg Met Ala Val Glu Arg Leu Ser Cys Ala Gly
355 360 365

Thr Thr Lys Val Arg Val Leu Val Gln Asp Gln Val Gln Pro Leu Glu
370 375 380

Phe Cys Gly Gly Asp Gln Asp Gly Leu Cys Ala Leu Asp Lys Phe Val
385 390 395 400

Glu Ser Gln Ala Tyr Ala Arg Ser Gly Gly Ala Gly Asp Phe Glu Lys
405 410 415

Cys Leu Ala Thr Thr Val
420

<210> 19
<211> 420
<212> PRT
<213> Trametes Pubescens

<400> 19

His Ile Pro Leu Arg Asp Thr Ser Ala Cys Leu Asp Val Thr Arg Asp
1 5 10 15

Val Gln Gln Ser Trp Ser Met Tyr Ser Pro Tyr Phe Pro Ala Ala Thr
20 25 30

Tyr Val Ala Pro Pro Ala Ser Cys Gln Ile Asn Gln Val His Ile Ile
35 40 45

Gln Arg His Gly Ala Arg Phe Pro Thr Ser Gly Ala Ala Lys Arg Ile
50 55 60

Gln Thr Ala Val Ala Lys Leu Lys Ala Ala Ser Asn Tyr Thr Asp Pro
65 70 75 80

Leu Leu Ala Phe Val Thr Asn Tyr Thr Tyr Ser Leu Gly Gln Asp Ser
85 90 95

Leu Val Glu Leu Gly Ala Thr Gln Ser Ser Glu Ala Gly Gln Glu Ala
100 105 110

Phe Thr Arg Tyr Ser Ser Leu Val Ser Ala Asp Glu Leu Pro Phe Val
115 120 125

Arg Ala Ser Gly Ser Asp Arg Val Val Ala Thr Ala Asn Asn Trp Thr
130 135 140

Ala Gly Phe Ala Leu Ala Ser Ser Asn Ser Ile Thr Pro Val Leu Ser
145 150 155 160

Val Ile Ile Ser Glu Ala Gly Asn Asp Thr Leu Asp Asp Asn Met Cys
165 170 175

Pro Ala Ala Gly Asp Ser Asp Pro Gln Val Asn Gln Trp Leu Ala Gln
180 185 190

Phe Ala Pro Pro Met Thr Ala Arg Leu Asn Ala Gly Ala Pro Gly Ala

195 200 205

Asn Leu Thr Asp Thr Asp Thr Tyr Asn Leu Leu Thr Leu Cys Pro Phe
210 215 220

Glu Thr Val Ala Thr Glu Arg Arg Ser Glu Phe Cys Asp Ile Tyr Glu
225 230 235 240

Glu Leu Gln Ala Glu Asp Ala Phe Ala Tyr Asn Ala Asp Leu Asp Lys
245 250 255

Phe Tyr Gly Thr Gly Tyr Gly Gln Pro Leu Gly Pro Val Gln Gly Val
260 265 270

Gly Tyr Ile Asn Glu Leu Ile Ala Arg Leu Thr Ala Gln Asn Val Ser
275 280 285

Asp His Thr Gln Thr Asn Ser Thr Leu Asp Ser Ser Pro Glu Thr Phe
290 295 300

Pro Leu Asn Arg Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gln Met
305 310 315 320

Val Ala Ile Phe Ser Ala Met Gly Leu Phe Asn Gln Ser Ala Pro Leu
325 330 335

Asp Pro Thr Thr Pro Asp Pro Ala Arg Thr Phe Leu Val Lys Lys Ile
340 345 350

Val Pro Phe Ser Ala Arg Met Val Val Glu Arg Leu Asp Cys Gly Gly
355 360 365

Ala Gln Ser Val Arg Leu Leu Val Asn Asp Ala Val Gln Pro Leu Ala
370 375 380

Phe Cys Gly Ala Asp Thr Ser Gly Val Cys Thr Leu Asp Ala Phe Val
385 390 395 400

Glu Ser Gln Ala Tyr Ala Arg Asn Asp Gly Glu Gly Asp Phe Glu Lys
405 410 415

Cys Phe Ala Thr
420

<210> 20
<211> 435

<212> PRT
<213> Agrocybe peidades

<400> 20

Gly Gly Val Val Gln Ala Thr Phe Val Gln Pro Phe Phe Pro Pro Gln
1 5 10 15

Ile Gln Asp Ser Trp Ala Ala Tyr Thr Pro Tyr Tyr Pro Val Gln Ala
20 25 30

Tyr Thr Pro Pro Pro Lys Asp Cys Lys Ile Thr Gln Val Asn Ile Ile
35 40 45

Gln Arg His Gly Ala Arg Phe Pro Thr Ser Gly Ala Gly Thr Arg Ile
50 55 60

Gln Ala Ala Val Lys Lys Leu Gln Ser Ala Lys Thr Tyr Thr Asp Pro
65 70 75 80

Arg Leu Asp Phe Leu Thr Asn Tyr Thr Tyr Thr Leu Gly His Asp Asp
85 90 95

Leu Val Pro Phe Gly Ala Leu Gln Ser Ser Gln Ala Gly Glu Glu Thr
100 105 110

Phe Gln Arg Tyr Ser Phe Leu Val Ser Lys Glu Asn Leu Pro Phe Val
115 120 125

Arg Ala Ser Ser Ser Asn Arg Val Val Asp Ser Ala Thr Asn Trp Thr
130 135 140

Glu Gly Phe Ser Ala Ala Ser His His Val Leu Asn Pro Ile Leu Phe
145 150 155 160

Val Ile Leu Ser Glu Ser Leu Asn Asp Thr Leu Asp Asp Ala Met Cys
165 170 175

Pro Asn Ala Gly Ser Ser Asp Pro Gln Thr Gly Ile Trp Thr Ser Ile
180 185 190

Tyr Gly Thr Pro Ile Ala Asn Arg Leu Asn Gln Gln Ala Pro Gly Ala
195 200 205

Asn Ile Thr Ala Ala Asp Val Ser Asn Leu Ile Pro Leu Cys Ala Phe
210 215 220

Glu Thr Ile Val Lys Glu Thr Pro Ser Pro Phe Cys Asn Leu Phe Thr
225 230 235 240

Pro Glu Glu Phe Ala Gln Phe Glu Tyr Phe Gly Asp Leu Asp Lys Phe
245 250 255

Tyr Gly Thr Gly Tyr Gly Gln Pro Leu Gly Pro Val Gln Gly Val Gly
260 265 270

Tyr Ile Asn Glu Leu Leu Ala Arg Leu Thr Glu Met Pro Val Arg Asp
275 280 285

Asn Thr Gln Thr Asn Arg Thr Leu Asp Ser Ser Pro Leu Thr Phe Pro
290 295 300

Leu Asp Arg Ser Ile Tyr Ala Asp Leu Ser His Asp Asn Gln Met Ile
305 310 315 320

Ala Ile Phe Ser Ala Met Gly Leu Phe Asn Gln Ser Ser Pro Leu Asp
325 330 335

Pro Ser Phe Pro Asn Pro Lys Arg Thr Trp Val Thr Ser Arg Leu Thr
340 345 350

Pro Phe Ser Ala Arg Met Val Thr Glu Arg Leu Leu Cys Gln Arg Asp
355 360 365

Gly Thr Gly Ser Gly Gly Pro Ser Arg Ile Met Arg Asn Gly Asn Val
370 375 380

Gln Thr Phe Val Arg Ile Leu Val Asn Asp Ala Leu Gln Pro Leu Lys
385 390 395 400

Phe Cys Gly Gly Asp Met Asp Ser Leu Cys Thr Leu Glu Ala Phe Val
405 410 415

Glu Ser Gln Lys Tyr Ala Arg Glu Asp Gly Gln Gly Asp Phe Glu Lys
420 425 430

Cys Phe Asp
435

<210> 21
<211> 419
<212> PRT
<213> Peniophora lycii

<400> 21

Ser Thr Gln Phe Ser Phe Val Ala Ala Gln Leu Pro Ile Pro Ala Gln
1 5 10 15

Asn Thr Ser Asn Trp Gly Pro Tyr Asp Pro Phe Phe Pro Val Glu Pro
20 25 30

Tyr Ala Ala Pro Pro Glu Gly Cys Thr Val Thr Gln Val Asn Leu Ile
35 40 45

Gln Arg His Gly Ala Arg Trp Pro Thr Ser Gly Ala Arg Ser Arg Gln
50 55 60

Val Ala Ala Val Ala Lys Ile Gln Met Ala Arg Pro Phe Thr Asp Pro
65 70 75 80

Lys Tyr Glu Phe Leu Asn Asp Phe Val Tyr Lys Phe Gly Val Ala Asp
85 90 95

Leu Leu Pro Phe Gly Ala Asn Gln Ser His Gln Thr Gly Thr Asp Met
100 105 110

Tyr Thr Arg Tyr Ser Thr Leu Phe Glu Gly Gly Asp Val Pro Phe Val
115 120 125

Arg Ala Ala Gly Asp Gln Arg Val Val Asp Ser Ser Thr Asn Trp Thr
130 135 140

Ala Gly Phe Gly Asp Ala Ser Gly Glu Thr Val Leu Pro Thr Leu Gln
145 150 155 160

Val Val Leu Gln Glu Glu Gly Asn Cys Thr Leu Cys Asn Asn Met Cys
165 170 175

Pro Asn Glu Val Asp Gly Asp Glu Ser Thr Thr Trp Leu Gly Val Phe
180 185 190

Ala Pro Asn Ile Thr Ala Arg Leu Asn Ala Ala Ala Pro Ser Ala Asn
195 200 205

Leu Ser Asp Ser Asp Ala Leu Thr Leu Met Asp Met Cys Pro Phe Asp
210 215 220

Thr Leu Ser Ser Gly Asn Ala Ser Pro Phe Cys Asp Leu Phe Thr Ala
225 230 235 240

Glu Glu Tyr Val Ser Tyr Glu Tyr Tyr Tyr Asp Leu Asp Lys Tyr Tyr
245 250 255

Gly Thr Gly Pro Gly Asn Ala Leu Gly Pro Val Gln Gly Val Gly Tyr
260 265 270

Val Asn Glu Leu Leu Ala Arg Leu Thr Gly Gln Ala Val Arg Asp Glu
275 280 285

Thr Gln Thr Asn Arg Thr Leu Asp Ser Asp Pro Ala Thr Phe Pro Leu
290 295 300

Asn Arg Thr Phe Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Pro
305 310 315 320

Ile Phe Ala Ala Leu Gly Leu Phe Asn Ala Thr Ala Leu Asp Pro Leu
325 330 335

Lys Pro Asp Glu Asn Arg Leu Trp Val Asp Ser Lys Leu Val Pro Phe
340 345 350

Ser Gly His Met Thr Val Glu Lys Leu Ala Cys Ser Gly Lys Glu Ala
355 360 365

Val Arg Val Leu Val Asn Asp Ala Val Gln Pro Leu Glu Phe Cys Gly
370 375 380

Gly Val Asp Gly Val Cys Glu Leu Ser Ala Phe Val Glu Ser Gln Thr
385 390 395 400

Tyr Ala Arg Glu Asn Gly Gln Gly Asp Phe Ala Lys Cys Gly Phe Val
405 410 415

Pro Ser Glu

<210> 22
<211> 369
<212> PRT
<213> Peniophora lycii

<400> 22

Ser Pro Arg Thr Ala Ala Gln Leu Pro Ile Pro Gln Gln Trp Ser Pro
1 5 10 15

Tyr Ser Pro Tyr Phe Pro Val Ala Tyr Ala Pro Pro Ala Gly Cys Gln

20 25 30

Ile Gln Val Asn Ile Ile Gln Arg His Gly Ala Arg Phe Pro Thr Ser
35 40 45

Gly Ala Ala Thr Arg Ile Gln Ala Ala Val Ala Lys Leu Gln Ser Ala
50 55 60

Thr Asp Pro Lys Leu Asp Phe Leu Asn Thr Tyr Leu Gly Asp Asp Leu
65 70 75 80

Val Pro Phe Gly Ala Gln Ser Ser Gln Ala Gly Gln Glu Ala Phe Thr
85 90 95

Arg Tyr Ser Leu Val Ser Asp Asn Leu Pro Phe Val Arg Ala Ser Gly
100 105 110

Ser Asp Arg Val Val Asp Ser Ala Thr Asn Trp Thr Ala Gly Phe Ala
115 120 125

Ala Ser Asn Thr Pro Leu Val Ile Leu Ser Glu Gly Asn Asp Thr Leu
130 135 140

Asp Asp Asn Met Cys Pro Ala Gly Asp Ser Asp Pro Gln Asn Trp Leu
145 150 155 160

Ala Val Phe Ala Pro Pro Ile Thr Ala Arg Leu Asn Ala Ala Ala Pro
165 170 175

Gly Ala Asn Leu Thr Asp Asp Ala Asn Leu Leu Cys Pro Phe Glu Thr
180 185 190

Val Ser Glu Ser Phe Cys Asp Leu Phe Glu Pro Glu Glu Phe Ala Phe
195 200 205

Tyr Gly Asp Leu Asp Lys Phe Tyr Gly Thr Gly Tyr Gly Gln Pro Leu
210 215 220

Gly Pro Val Gln Gly Val Gly Tyr Ile Asn Glu Leu Leu Ala Arg Leu
225 230 235 240

Thr Gln Ala Val Arg Asp Asn Thr Gln Thr Asn Arg Thr Leu Asp Ser
245 250 255

Ser Pro Thr Phe Pro Leu Asn Arg Thr Phe Tyr Ala Asp Phe Ser His
260 265 270

Asp Asn Gln Met Val Ala Ile Phe Ser Ala Met Gly Leu Phe Asn Gln
275 280 285

Ser Ala Pro Leu Asp Pro Ser Pro Asp Pro Asn Arg Thr Trp Val Thr
290 295 300

Ser Lys Leu Val Pro Phe Ser Ala Arg Met Val Val Glu Arg Leu Cys
305 310 315 320

Gly Thr Val Arg Val Leu Val Asn Asp Ala Val Gln Pro Leu Glu Phe
325 330 335

Cys Gly Gly Asp Asp Gly Cys Thr Leu Asp Ala Phe Val Glu Ser Gln
340 345 350

Tyr Ala Arg Glu Asp Gly Gln Gly Asp Phe Glu Lys Cys Phe Ala Thr
355 360 365

Pro

<210> 23
<211> 440
<212> PRT
<213> Thermomyces lanuginosus

<400> 23

Asn Val Asp Ile Ala Arg His Trp Gly Gln Tyr Ser Pro Phe Phe Ser
1 5 10 15

Leu Ala Glu Val Ser Glu Ile Ser Pro Ala Val Pro Lys Gly Cys Arg
20 25 30

Val Glu Phe Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr
35 40 45

Ala His Lys Ser Glu Val Tyr Ala Glu Leu Leu Gln Arg Ile Gln Asp
50 55 60

Thr Ala Thr Glu Phe Lys Gly Asp Phe Ala Phe Leu Arg Asp Tyr Ala
65 70 75 80

Tyr His Leu Gly Ala Asp Asn Leu Thr Arg Phe Gly Glu Glu Gln Met
85 90 95

Met Glu Ser Gly Arg Gln Phe Tyr His Arg Tyr Arg Glu Gln Ala Arg
100 105 110

Glu Ile Val Pro Phe Val Arg Ala Ala Gly Ser Ala Arg Val Ile Ala
115 120 125

Ser Ala Glu Phe Phe Asn Arg Gly Phe Gln Asp Ala Lys Asp Arg Asp
130 135 140

Pro Arg Ser Asn Lys Asp Gln Ala Glu Pro Val Ile Asn Val Ile Ile
145 150 155 160

Ser Glu Glu Thr Gly Ser Asn Asn Thr Leu Asp Gly Leu Thr Cys Pro
165 170 175

Ala Ala Glu Glu Ala Pro Asp Pro Thr Gln Pro Ala Glu Phe Leu Gln
180 185 190

Val Phe Gly Pro Arg Val Leu Lys Lys Ile Thr Lys His Met Pro Gly
195 200 205

Val Asn Leu Thr Leu Glu Asp Val Pro Leu Phe Met Asp Leu Cys Pro
210 215 220

Phe Asp Thr Val Gly Ser Asp Pro Val Leu Phe Pro Arg Gln Leu Ser
225 230 235 240

Pro Phe Cys His Leu Phe Thr Ala Asp Asp Trp Met Ala Tyr Asp Tyr
245 250 255

Tyr Tyr Thr Leu Asp Lys Tyr Tyr Ser His Gly Gly Gly Ser Ala Phe
260 265 270

Gly Pro Ser Arg Gly Val Gly Phe Val Asn Glu Leu Ile Ala Arg Met
275 280 285

Thr Gly Asn Leu Pro Val Lys Asp His Thr Thr Val Asn His Thr Leu
290 295 300

Asp Asp Asn Pro Glu Thr Phe Pro Leu Asp Ala Val Leu Tyr Ala Asp
305 310 315 320

Phe Ser His Asp Asn Thr Met Thr Gly Ile Phe Ser Ala Met Gly Leu
325 330 335

Tyr Asn Gly Thr Lys Pro Leu Ser Thr Ser Lys Ile Gln Pro Pro Thr

340 345 350

Gly Ala Ala Ala Asp Gly Tyr Ala Ala Ser Trp Thr Val Pro Phe Ala
355 360 365

Ala Arg Ala Tyr Val Glu Leu Leu Arg Cys Glu Thr Glu Thr Ser Ser
370 375 380

Glu Glu Glu Glu Glu Gly Glu Asp Glu Pro Phe Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Arg Val Asp Arg Trp Gly
405 410 415

Arg Cys Arg Arg Asp Glu Trp Ile Lys Gly Leu Thr Phe Ala Arg Gln
420 425 430

Gly Gly His Trp Asp Arg Cys Phe
435 440

<210> 24
<211> 441
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 24

Asn Ser His Ser Cys Asp Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro
1 5 10 15

Glu Ile Ser His Leu Trp Gly Gln Tyr Ser Pro Phe Phe Ser Leu Ala
20 25 30

Asp Glu Ser Ala Ile Ser Pro Asp Val Pro Lys Gly Cys Arg Val Thr
35 40 45

Phe Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
50 55 60

Lys Ser Lys Lys Tyr Ser Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala
65 70 75 80

Thr Ala Phe Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
85 90 95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Gln Gln Met Val Asn
100 105 110

Ser Gly Ile Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile
115 120 125

Val Pro Phe Val Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Ala
130 135 140

Glu Lys Phe Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly
145 150 155 160

Ala Asn Pro His Gln Ala Ser Pro Val Ile Asn Val Ile Ile Pro Glu
165 170 175

Gly Ala Gly Tyr Asn Asn Thr Leu Asp His Gly Leu Cys Thr Ala Phe
180 185 190

Glu Glu Ser Glu Leu Gly Asp Asp Val Glu Ala Asn Phe Thr Ala Val
195 200 205

Phe Ala Pro Pro Ile Arg Ala Arg Leu Glu Ala His Leu Pro Gly Val
210 215 220

Asn Leu Thr Asp Glu Asp Val Val Asn Leu Met Asp Met Cys Pro Phe
225 230 235 240

Asp Thr Val Ala Arg Thr Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys
245 250 255

Asp Leu Phe Thr His Asp Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser
260 265 270

Leu Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala
275 280 285

Gln Gly Val Gly Phe Val Asn Glu Leu Ile Ala Arg Leu Thr His Ser
290 295 300

Pro Val Gln Asp His Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro
305 310 315 320

Ala Thr Phe Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp
325 330 335

Asn Thr Met Val Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr

340 345 350

Lys Pro Leu Ser Thr Thr Ser Val Glu Ser Ile Glu Glu Thr Asp Gly
355 360 365

Tyr Ala Ala Ser Trp Thr Val Pro Phe Ala Ala Arg Ala Tyr Val Glu
370 375 380

Met Met Gln Cys Glu Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val
385 390 395 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Gly Val Asp Lys Leu Gly
405 410 415

Arg Cys Lys Arg Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser
420 425 430

Gly Gly Asn Trp Glu Glu Cys Phe Ala
435 440

<210> 25
<211> 1426
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (12)..(1412)
<223>

<220>
<221> mat_peptide
<222> (90)..()
<223>

<220>
<221> sig_peptide
<222> (12)..(89)
<223>

<400> 25
tatatgaatt c atg ggc gtg ttc gtc gtg cta ctg tcc att gcc acc ttg 50
Met Gly Val Phe Val Val Leu Ser Ile Ala Thr Leu
-25 -20 -15

ttc ggt tcc aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac 98
Phe Gly Ser Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His
-10 -5 -1 1

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tct tgt gac act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct      146
Ser Cys Asp Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser
  5                  10                  15

cac ttg tgg ggt caa tac tct cca ttc ttc tct ttg gct gac gaa tct      194
His Leu Trp Gly Gln Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser
20                  25                  30                  35

gct att tct cca gac gtt cca aag ggt tgt aga gtt act ttc gtt caa      242
Ala Ile Ser Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln
              40                  45                  50

gtt ttg tct aga cac ggt gct aga tac cca act tct tct aag tct aag      290
Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys
          55                  60                  65

aag tac tct gct ttg att gaa gct att caa aag aac gct act gct ttc      338
Lys Tyr Ser Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe
      70                  75                  80

aag ggt aag tac gct ttc ttg aag act tac aac tac act ttg ggt gct      386
Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala
  85                  90                  95

gac gac ttg act cca ttc ggt gaa caa caa atg gtt aac tct ggt att      434
Asp Asp Leu Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile
100                 105                 110                 115

aag ttc tac aga aga tac aag gct ttg gct aga aag att gtt cca ttc      482
Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe
              120                 125                 130

gtt aga gct tct ggt tct gac aga gtt att gct tct gct gaa aag ttc      530
Val Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe
          135                 140                 145

att gaa ggt ttc caa tct gct aag ttg gct gac cca ggt gct aac cca      578
Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro
      150                 155                 160

cac caa gct tct cca gtt att aac gtt att att cca gaa ggt gct ggt      626
His Gln Ala Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly
  165                 170                 175

tac aac aac act ttg gac cac ggt ttg tgt act gct ttc gaa gaa tct      674
Tyr Asn Asn Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser
180                 185                 190                 195

gaa ttg ggt gac gac gtt gaa gct aac ttc act gct gtt ttc gct cca      722
Glu Leu Gly Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro
              200                 205                 210

cct att aga gct aga ttg gaa gct cac ttg cca ggt gtt aac ttg act      770
Pro Ile Arg Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr
          215                 220                 225

gac gaa gac gtt gtt aac ttg atg gac atg tgt cca ttc gac act gtt      818
Asp Glu Asp Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val
      230                 235                 240
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gct aga act tct gac gct act caa ttg tct cca ttc tgt gac ttg ttc      866
Ala Arg Thr Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe
    245                 250                 255

act cac gac gaa tgg att caa tac gac tac ttg caa tct ttg ggt aag      914
Thr His Asp Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys
260                 265                 270                 275

tac tac ggt tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt      962
Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val
                280                 285                 290

ggt ttc gtt aac gaa ttg att gct aga ttg act cac tct cca gtt caa     1010
Gly Phe Val Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln
            295                 300                 305

gac cac act tct act aac cac act ttg gac tct aac cca gct act ttc     1058
Asp His Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe
        310                 315                 320

cca ttg aac gct act ttg tac gct gac ttc tct cac gac aac act atg     1106
Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met
    325                 330                 335

gtt tct att ttc ttc gct ttg ggt ttg tac aac ggt act aag cca ttg     1154
Val Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu
340                 345                 350                 355

tct act act tct gtt gaa tct att gaa gaa act gac ggt tac gct gct     1202
Ser Thr Thr Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ala Ala
                360                 365                 370

tct tgg act gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa     1250
Ser Trp Thr Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln
            375                 380                 385

tgt gaa gct gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga     1298
Cys Glu Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg
        390                 395                 400

gtt gtt cca ttg cac ggt tgt ggt gtt gac aag ttg ggt aga tgt aag     1346
Val Val Pro Leu His Gly Cys Gly Val Asp Lys Leu Gly Arg Cys Lys
    405                 410                 415

aga gac gac ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac     1394
Arg Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn
420                 425                 430                 435

tgg gaa gaa tgt ttc gct taagaattca tata                            1426
Trp Glu Glu Cys Phe Ala
                440
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<210> 26
<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 26

Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
-25 -20 -15

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10 -5 -1 1 5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10 15 20

Gly Gln Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
25 30 35

Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
40 45 50

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Lys Tyr Ser
55 60 65 70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
75 80 85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90 95 100

Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
105 110 115

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Val Arg Ala
120 125 130

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135 140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
155 160 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
170 175 180

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Glu Leu Gly
185 190 195

Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
200 205 210

Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
215 220 225 230

Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
250 255 260

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
265 270 275

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
280 285 290

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
295 300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
330 335 340

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
345 350 355

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ala Ala Ser Trp Thr
360 365 370

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
375 380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Gly Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu
425 430 435

Cys Phe Ala
440

<210> 27
<211> 437
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 27

Asn Ser His Ser Cys Asp Thr Val Asp Gly Tyr Gln Cys Pro Glu Ile
1 5 10 15

Ser His Leu Trp Gly Gln Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu
20 25 30

Ser Ala Ile Ser Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val
35 40 45

Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser
50 55 60

Lys Lys Tyr Ser Ala Leu Ile Glu Arg Ile Gln Lys Asn Ala Thr Phe
65 70 75 80

Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala
85 90 95

Asp Asp Leu Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile
100 105 110

Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Asn Ile Val Pro Phe
115 120 125

Val Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe
130 135 140

Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Ala His Gln Ala
145 150 155 160

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
165 170 175

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Asp Ser Thr Leu Gly
180 185 190

Asp Asp Ala Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
195 200 205

Ala Arg Leu Glu Ala Leu Pro Gly Val Asn Leu Thr Asp Glu Asp Val
210 215 220

Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr Ser
225 230 235 240

Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr Ala Asp Glu
245 250 255

Trp Gln Tyr Asp Tyr Leu Gln Ser Leu Lys Tyr Tyr Gly Tyr Gly Ala
260 265 270

Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Asn Glu Leu Ile
275 280 285

Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr Ser Thr Asn His
290 295 300

Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn Ala Thr Leu Tyr
305 310 315 320

Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile Phe Phe Ala Leu
325 330 335

Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr Ser Val Glu Ser
340 345 350

Ile Glu Thr Asp Gly Tyr Ala Ala Ser Trp Thr Val Pro Phe Ala Ala
355 360 365

Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala Gly Gly Gly Gly Gly
370 375 380

Glu Gly Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val
385 390 395 400

Val Pro Leu His Gly Cys Gly Val Asp Lys Leu Gly Arg Cys Lys Leu
405 410 415

Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp
420 425 430

Ala Glu Cys Phe Ala
435

<210> 28
<211> 1404
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (1)..(1401)
<223>

<220>
<221> mat_peptide
<222> (79)..()
<223>

<220>
<221> sig_peptide
<222> (1)..(78)
<223>

<400> 28

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atg ggc gtg ttc gtc gtg cta ctg tcc att gcc acc ttg ttc ggt tcc      48
Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
    -25                 -20                 -15

aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac tct tgt gac      96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10                 -5                  -1  1                   5

act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct cac ttg tgg     144
Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
            10                  15                  20

ggt acc tac tct cca tac ttc tct ttg gca gac gaa tct gct att tct     192
Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
        25                  30                  35

cca gac gtt cca gac gac tgt aga gtt act ttc gtt caa gtt ttg tct     240
Pro Asp Val Pro Asp Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
    40                  45                  50

aga cac ggt gct aga tac cca act tct tct gcg tct aag gct tac tct     288
Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
55                  60                  65                  70

gct ttg att gaa gct att caa aag aac gct act gct ttc aag ggt aag     336
Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
                75                  80                  85

tac gct ttc ttg aag act tac aac tac act ttg ggt gct gac gac ttg     384
Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
            90                  95                  100

act cca ttc ggt gaa aac caa atg gtt aac tct ggt att aag ttc tac     432
Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
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        105                 110                 115

aga aga tac aag gct ttg gct aga aag att gtt cca ttc att aga gct      480
Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
    120                 125                 130

tct ggt tct gac aga gtt att gct tct gct gaa aag ttc att gaa ggt      528
Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135                 140                 145                 150

ttc caa tct gct aag ttg gct gac cca ggt tct caa cca cac caa gct      576
Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
                155                 160                 165

tct cca gtt att aac gtg atc att cca gaa gga tcc ggt tac aac aac      624
Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
            170                 175                 180

act ttg gac cac ggt act tgt act gct ttc gaa gac tct gaa tta ggt      672
Thr Leu Asp His Gly Thr Cys Thr Ala Phe Glu Asp Ser Glu Leu Gly
        185                 190                 195

gac gac gtt gaa gct aac ttc act gct ttg ttc gct cca gct att aga      720
Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
    200                 205                 210

gct aga ttg gaa gct gac ttg cca ggt gtt act ttg act gac gaa gac      768
Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
215                 220                 225                 230

gtt gtt tac ttg atg gac atg tgt cca ttc gac act gtc gct aga act      816
Val Val Tyr Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
                235                 240                 245

tct gac gct act gaa ttg tct cca ttc tgt gct ttg ttc act cac gac      864
Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
            250                 255                 260

gaa tgg atc caa tac gac tac ttg caa agc ttg ggt aag tac tac ggt      912
Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
        265                 270                 275

tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt ggt ttc gct      960
Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
    280                 285                 290

aac gaa ttg att gct aga ttg act cac tct cca gtt caa gac cac act     1008
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
295                 300                 305                 310

tct act aac cac act ttg gac tct aac cca gct act ttc cca ttg aac     1056
Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
                315                 320                 325

gct act ttg tac gct gac ttc tct cac gac aac act atg ata tct att     1104
Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Ile Ser Ile
            330                 335                 340

ttc ttc gct ttg ggt ttg tac aac ggt acc aag cca ttg tct act act     1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
        345                 350                 355
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tct gtt gaa tct att gaa gaa act gac ggt tac tct gct tct tgg act      1200
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
    360                 365                 370

gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa tgt caa gct      1248
Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
375                 380                 385                 390

gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga gtt gtt cca      1296
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
                395                 400                 405

ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag aga gac gac      1344
Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
            410                 415                 420

ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac tgg gct gaa      1392
Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
        425                 430                 435

tgt ttc gct taa                                                     1404
Cys Phe Ala
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<210> 29
<211> 467
<212> PRT
<213> Artificial Sequence

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<223> Synthetic

<400> 29

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Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10                 -5                  -1  1                   5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
            10                  15                  20

Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
        25                  30                  35

Pro Asp Val Pro Asp Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
    40                  45                  50

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
55                  60                  65                  70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
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75 80 85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90 95 100

Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
105 110 115

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
120 125 130

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135 140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
155 160 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
170 175 180

Thr Leu Asp His Gly Thr Cys Thr Ala Phe Glu Asp Ser Glu Leu Gly
185 190 195

Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
200 205 210

Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
215 220 225 230

Val Val Tyr Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250 255 260

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
265 270 275

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
280 285 290

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
295 300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Ile Ser Ile
330 335 340

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
345 350 355

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
360 365 370

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
375 380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
425 430 435

Cys Phe Ala
440

<210> 30
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<212> DNA
<213> Artificial Sequence

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<223> Synthetic

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<222> (1)..(1401)
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<222> (1)..(78)
<223>

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Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
    -25                 -20                 -15

aca tcc ggt acc gcc ttg ggt cct cgt ggt aac tct cac tct tgt gac      96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10                 -5                  -1  1                   5

act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct cac ttg tgg     144
Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
            10                  15                  20

ggt aca tac tct cca ttc ttc tct ttg gct gac gaa tct gct att tct     192
Gly Thr Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
        25                  30                  35

cca gac gtt cca aag ggt tgt aga gtt act ttc gtt caa gtt ttg tct     240
Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
    40                  45                  50

aga cac ggt gct aga tac cca act tct tct gcg tct aag gcg tac tct     288
Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
55                  60                  65                  70

gct ttg att gaa gct att caa aag aac gct act gct ttc aag ggt aag     336
Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
                75                  80                  85

tac gct ttc ttg aag act tac aac tac act ttg ggt gct gac gac ttg     384
Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
            90                  95                  100

act cca ttc ggt gaa caa caa atg gtt aac tct ggt att aag ttc tac     432
Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
        105                 110                 115

aga aga tac aag gct ttg gct aga aag att gtt cca ttc att aga gct     480
Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
    120                 125                 130

tct ggt tct gac aga gtt att gct tct gct gaa aag ttc att gaa ggt     528
Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135                 140                 145                 150

ttc caa tct gct aag ttg gct gac cca ggt gct aac cca cac caa gct     576
Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
                155                 160                 165

tct cca gtt att aac gtt att att cca gaa ggt gct ggt tac aac aac     624
Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
            170                 175                 180

act ttg gac cac ggt ttg tgt act gct ttc gaa gaa tct gaa ttg ggt     672
Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Glu Leu Gly
        185                 190                 195

gac gac gtt gaa gct aac ttc act gct gtt ttc gct cca cca att aga     720
Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
    200                 205                 210

gct aga ttg gaa gct cac ttg cca ggt gtt aac ttg act gac gaa gac     768
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Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
215                 220                 225                 230

gtt gtt aac ttg atg gac atg tgt cca ttc gac act gtt gct aga act      816
Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
                235                 240                 245

tct gac gct act caa ttg tct cca ttc tgt gac ttg ttc act cac gac      864
Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
            250                 255                 260

gaa tgg att caa tac gac tac ttg caa tct ttg ggt aag tac tac ggt      912
Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
        265                 270                 275

tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt ggt ttc gtt      960
Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
    280                 285                 290

aac gaa ttg att gct aga ttg act cac tct cca gtt caa gac cac act     1008
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
295                 300                 305                 310

tct act aac cac act ttg gac tct aac cca gct act ttc cca ttg aac     1056
Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
                315                 320                 325

gct act ttg tac gct gac ttc tct cac gac aac act atg gtt tct att     1104
Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
            330                 335                 340

ttc ttc gct ttg ggt ttg tac aac ggt act aag cca ttg tct act act     1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
        345                 350                 355

tct gtt gaa tct att gaa gaa act gac ggt tac tct gct tct tgg act     1200
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
    360                 365                 370

gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa tgt gaa gct     1248
Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
375                 380                 385                 390

gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga gtt gtt cca     1296
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
                395                 400                 405

ttg cac ggt tgt ggt gtt gac aag ttg ggt aga tgt aag aga gac gac     1344
Leu His Gly Cys Gly Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
            410                 415                 420

ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac tgg gaa gaa     1392
Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu
        425                 430                 435

tgt ttc gct taa                                                    1404
Cys Phe Ala
    440
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<210> 31

<211> 467
<212> PRT
<213> Artificial Sequence

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<400> 31

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Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
    -25                 -20                 -15

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10                 -5                  -1  1                   5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
            10                  15                  20

Gly Thr Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
        25                  30                  35

Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
    40                  45                  50

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
55                  60                  65                  70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
                75                  80                  85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
            90                  95                  100

Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
        105                 110                 115

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
    120                 125                 130

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135                 140                 145                 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
                155                 160                 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
            170                 175                 180
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Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Glu Leu Gly
185 190 195

Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
200 205 210

Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
215 220 225 230

Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
250 255 260

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
265 270 275

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
280 285 290

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
295 300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
330 335 340

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
345 350 355

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
360 365 370

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
375 380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Gly Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu

425 430 435

Cys Phe Ala
440

<210> 32
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<212> DNA
<213> Artificial Sequence

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<400> 32
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Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
-25 -20 -15

aca tcg ggc act gcg ctg ggc ccc cgt gga aat cac tcc aag tcc tgc 96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn His Ser Lys Ser Cys
-10 -5 -1 1 5

gat acg gta gac cta ggg tac cag tgc tcc cct gcg act tct cat cta 144
Asp Thr Val Asp Leu Gly Tyr Gln Cys Ser Pro Ala Thr Ser His Leu
10 15 20

tgg ggc acg tac tcg cca tac ttt tcg ctc gag gac gag ctg tcc gtg 192
Trp Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Glu Asp Glu Leu Ser Val
25 30 35

tcg agt aag ctt ccc aag gat tgc cgg atc acc ttg gta cag gtg cta 240
Ser Ser Lys Leu Pro Lys Asp Cys Arg Ile Thr Leu Val Gln Val Leu
40 45 50

tcg cgc cat gga gcg cgg tac cca acc agc tcc aag agc aaa aag tat 288
Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Lys Tyr
55 60 65 70

aag aag ctt att acg gcg atc cag gcc aat gcc acc gac ttc aag ggc 336
Lys Lys Leu Ile Thr Ala Ile Gln Ala Asn Ala Thr Asp Phe Lys Gly
75 80 85

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aag tac gcc ttt ttg aag acg tac aac tat act ctg ggt gcg gat gac      384
Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp
            90                  95                  100

ctc act ccc ttt ggg gag cag cag ctg gtg aac tcg ggc atc aag ttc      432
Leu Thr Pro Phe Gly Glu Gln Gln Leu Val Asn Ser Gly Ile Lys Phe
        105                 110                 115

tac cag agg tac aag gct ctg gcg cgc agt gtg gtg ccg ttt att cgc      480
Tyr Gln Arg Tyr Lys Ala Leu Ala Arg Ser Val Val Pro Phe Ile Arg
    120                 125                 130

gcc tca ggc tcg gac cgg gtt att gct tcg gga gag aag ttc atc gag      528
Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Gly Glu Lys Phe Ile Glu
135                 140                 145                 150

ggg ttc cag cag gcg aag ctg gct gat cct ggc gcg acg aac cgc gcc      576
Gly Phe Gln Gln Ala Lys Leu Ala Asp Pro Gly Ala Thr Asn Arg Ala
                155                 160                 165

gct ccg gcg att agt gtg att att ccg gag agc gag acg ttc aac aat      624
Ala Pro Ala Ile Ser Val Ile Ile Pro Glu Ser Glu Thr Phe Asn Asn
            170                 175                 180

acg ctg gac cac ggt gtg tgc acg aag ttt gag gcg agt cag ctg gga      672
Thr Leu Asp His Gly Val Cys Thr Lys Phe Glu Ala Ser Gln Leu Gly
        185                 190                 195

gat gag gtt gcg gcc aat ttc act gcg ctc ttt gca ccc gac atc cga      720
Asp Glu Val Ala Ala Asn Phe Thr Ala Leu Phe Ala Pro Asp Ile Arg
    200                 205                 210

gct cgc ctc gag aag cat ctt cct ggc gtg acg ctg aca gac gag gac      768
Ala Arg Leu Glu Lys His Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
215                 220                 225                 230

gtt gtc agt cta atg gac atg tgt ccg ttt gat acg gta gcg cgc acc      816
Val Val Ser Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
                235                 240                 245

agc gac gca agt cag ctg tca ccg ttc tgt caa ctc ttc act cac aat      864
Ser Asp Ala Ser Gln Leu Ser Pro Phe Cys Gln Leu Phe Thr His Asn
            250                 255                 260

gag tgg aag aag tac gac tac ctt cag tcc ttg ggc aag tac tac ggc      912
Glu Trp Lys Lys Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
        265                 270                 275

tac ggc gca ggc aac cct ctg gga ccg gct cag ggg ata ggg ttc acc      960
Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Ile Gly Phe Thr
    280                 285                 290

aac gag ctg att gcc cgg ttg acg cgt tcg cca gtg cag gac cac acc     1008
Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln Asp His Thr
295                 300                 305                 310

agc act aac tcg act cta gtc tcc aac ccg gcc acc ttc ccg ttg aac     1056
Ser Thr Asn Ser Thr Leu Val Ser Asn Pro Ala Thr Phe Pro Leu Asn
                315                 320                 325
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gct acc atg tac gtc gac ttt tca cac gac aac agc atg gtt tcc atc      1104
Ala Thr Met Tyr Val Asp Phe Ser His Asp Asn Ser Met Val Ser Ile
            330                 335                 340

ttc ttt gca ttg ggc ctg tac aac ggc act gaa ccc ttg tcc cgg acc      1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Glu Pro Leu Ser Arg Thr
        345                 350                 355

tcg gtg gaa agc gcc aag gaa ttg gat ggg tat tct gca tcc tgg gtg      1200
Ser Val Glu Ser Ala Lys Glu Leu Asp Gly Tyr Ser Ala Ser Trp Val
    360                 365                 370

gtg cct ttc ggc gcg cga gcc tac ttc gag acg atg caa tgc aag tcg      1248
Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr Met Gln Cys Lys Ser
375                 380                 385                 390

gaa aag gag cct ctt gtt cgc gct ttg att aat gac cgg gtt gtg cca      1296
Glu Lys Glu Pro Leu Val Arg Ala Leu Ile Asn Asp Arg Val Val Pro
                395                 400                 405

ctg cat ggc tgc gat gtg gac aag ctg ggg cga tgc aag ctg aat gac      1344
Leu His Gly Cys Asp Val Asp Lys Leu Gly Arg Cys Lys Leu Asn Asp
            410                 415                 420

ttt gtc aag gga ttg agt tgg gcc aga tct ggg ggc aac tgg gga gag      1392
Phe Val Lys Gly Leu Ser Trp Ala Arg Ser Gly Gly Asn Trp Gly Glu
        425                 430                 435

tgc ttt agt tga                                                     1404
Cys Phe Ser
    440
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<210> 33
<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 33

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Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
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Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn His Ser Lys Ser Cys
-10                 -5                  -1  1                   5

Asp Thr Val Asp Leu Gly Tyr Gln Cys Ser Pro Ala Thr Ser His Leu
            10                  15                  20

Trp Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Glu Asp Glu Leu Ser Val
        25                  30                  35

Ser Ser Lys Leu Pro Lys Asp Cys Arg Ile Thr Leu Val Gln Val Leu
    40                  45                  50
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Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Lys Tyr
55 60 65 70

Lys Lys Leu Ile Thr Ala Ile Gln Ala Asn Ala Thr Asp Phe Lys Gly
75 80 85

Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp
90 95 100

Leu Thr Pro Phe Gly Glu Gln Gln Leu Val Asn Ser Gly Ile Lys Phe
105 110 115

Tyr Gln Arg Tyr Lys Ala Leu Ala Arg Ser Val Val Pro Phe Ile Arg
120 125 130

Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Gly Glu Lys Phe Ile Glu
135 140 145 150

Gly Phe Gln Gln Ala Lys Leu Ala Asp Pro Gly Ala Thr Asn Arg Ala
155 160 165

Ala Pro Ala Ile Ser Val Ile Ile Pro Glu Ser Glu Thr Phe Asn Asn
170 175 180

Thr Leu Asp His Gly Val Cys Thr Lys Phe Glu Ala Ser Gln Leu Gly
185 190 195

Asp Glu Val Ala Ala Asn Phe Thr Ala Leu Phe Ala Pro Asp Ile Arg
200 205 210

Ala Arg Leu Glu Lys His Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
215 220 225 230

Val Val Ser Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Ser Gln Leu Ser Pro Phe Cys Gln Leu Phe Thr His Asn
250 255 260

Glu Trp Lys Lys Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
265 270 275

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Ile Gly Phe Thr
280 285 290

Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln Asp His Thr
295 300 305 310

Ser Thr Asn Ser Thr Leu Val Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Met Tyr Val Asp Phe Ser His Asp Asn Ser Met Val Ser Ile
330 335 340

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Glu Pro Leu Ser Arg Thr
345 350 355

Ser Val Glu Ser Ala Lys Glu Leu Asp Gly Tyr Ser Ala Ser Trp Val
360 365 370

Val Pro Phe Gly Ala Arg Ala Tyr Phe Glu Thr Met Gln Cys Lys Ser
375 380 385 390

Glu Lys Glu Pro Leu Val Arg Ala Leu Ile Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Asp Val Asp Lys Leu Gly Arg Cys Lys Leu Asn Asp
410 415 420

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Cys Phe Ser
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ttc ggt tcc aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac 98
Phe Gly Ser Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His
-10 -5 -1 1

tct tgt gac act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct 146
Ser Cys Asp Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser
5 10 15

cac ttg tgg ggt caa tac tct cca tac ttc tct ttg gaa gac gaa tct 194
His Leu Trp Gly Gln Tyr Ser Pro Tyr Phe Ser Leu Glu Asp Glu Ser
20 25 30 35

gct att tct cca gac gtt cca gac gac tgt aga gtt act ttc gtt caa 242
Ala Ile Ser Pro Asp Val Pro Asp Asp Cys Arg Val Thr Phe Val Gln
40 45 50

gtt ttg tct aga cac ggt gct aga tac cca act gac tct aag ggt aag 290
Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys
55 60 65

aag tac tct gct ttg att gaa gct att caa aag aac gct act gct ttc 338
Lys Tyr Ser Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe
70 75 80

aag ggt aag tac gct ttc ttg aag act tac aac tac act ttg ggt gct 386
Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala
85 90 95

gac gac ttg act cca ttc ggt gaa aac caa atg gtt aac tct ggt att 434
Asp Asp Leu Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile
100 105 110 115

aag ttc tac aga aga tac aag gct ttg gct aga aag att gtt cca ttc 482
Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe
120 125 130

att aga gct tct ggt tct tct aga gtt att gct tct gct gaa aag ttc 530
Ile Arg Ala Ser Gly Ser Ser Arg Val Ile Ala Ser Ala Glu Lys Phe
135 140 145

att gaa ggt ttc caa tct gct aag ttg gct gac cca ggt tct caa cca 578
Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro
150 155 160

cac caa gct tct cca gtt att gac gtt att att tct gac gct tct tct 626
His Gln Ala Ser Pro Val Ile Asp Val Ile Ile Ser Asp Ala Ser Ser
165 170 175

tac aac aac act ttg gac cca ggt act tgt act gct ttc gaa gac tct 674
Tyr Asn Asn Thr Leu Asp Pro Gly Thr Cys Thr Ala Phe Glu Asp Ser

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180                 185                 190                 195

gaa ttg gct gac act gtt gaa gct aac ttc act gct ttg ttc gct cca      722
Glu Leu Ala Asp Thr Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro
                200                 205                 210

gct att aga gct aga ttg gaa gct gac ttg cca ggt gtt act ttg act      770
Ala Ile Arg Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr
            215                 220                 225

gac act gaa gtt act tac ttg atg gac atg tgt tct ttc gaa act gtt      818
Asp Thr Glu Val Thr Tyr Leu Met Asp Met Cys Ser Phe Glu Thr Val
        230                 235                 240

gct aga act tct gac gct act gaa ttg tct cca ttc tgt gct ttg ttc      866
Ala Arg Thr Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe
    245                 250                 255

act cac gac gaa tgg aga cac tac gac tac ttg caa tct ttg aag aag      914
Thr His Asp Glu Trp Arg His Tyr Asp Tyr Leu Gln Ser Leu Lys Lys
260                 265                 270                 275

tac tac ggt cac ggt gct ggt aac cca ttg ggt cca act caa ggt gtt      962
Tyr Tyr Gly His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val
                280                 285                 290

ggt ttc gct aac gaa ttg att gct aga ttg act aga tct cca gtt caa     1010
Gly Phe Ala Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln
            295                 300                 305

gac cac act tct act aac cac act ttg gac tct aac cca gct act ttc     1058
Asp His Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe
        310                 315                 320

cca ttg aac gct act ttg tac gct gac ttc tct cac gac aac ggt att     1106
Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile
    325                 330                 335

att tct att ttc ttc gct ttg ggt ttg tac aac ggt act gct cca ttg     1154
Ile Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Ala Pro Leu
340                 345                 350                 355

tct act act tct gtt gaa tct att gaa gaa act gac ggt tac tct tct     1202
Ser Thr Thr Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ser
                360                 365                 370

gct tgg act gtt cca ttc gct tct aga gct tac gtt gaa atg atg caa     1250
Ala Trp Thr Val Pro Phe Ala Ser Arg Ala Tyr Val Glu Met Met Gln
            375                 380                 385

tgt caa gct gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga     1298
Cys Gln Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg
        390                 395                 400

gtt gtt cca ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag     1346
Val Val Pro Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys
    405                 410                 415

aga gac gac ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac     1394
Arg Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn
420                 425                 430                 435
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Trp Ala Glu Cys Phe Ala
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Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-10 -5 -1 1 5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10 15 20

Gly Gln Tyr Ser Pro Tyr Phe Ser Leu Glu Asp Glu Ser Ala Ile Ser
25 30 35

Pro Asp Val Pro Asp Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
40 45 50

Arg His Gly Ala Arg Tyr Pro Thr Asp Ser Lys Gly Lys Lys Tyr Ser
55 60 65 70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
75 80 85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90 95 100

Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
105 110 115

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
120 125 130

Ser Gly Ser Ser Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
135 140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala

155 160 165

Ser Pro Val Ile Asp Val Ile Ile Ser Asp Ala Ser Ser Tyr Asn Asn
170 175 180

Thr Leu Asp Pro Gly Thr Cys Thr Ala Phe Glu Asp Ser Glu Leu Ala
185 190 195

Asp Thr Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
200 205 210

Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Thr Glu
215 220 225 230

Val Thr Tyr Leu Met Asp Met Cys Ser Phe Glu Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250 255 260

Glu Trp Arg His Tyr Asp Tyr Leu Gln Ser Leu Lys Lys Tyr Tyr Gly
265 270 275

His Gly Ala Gly Asn Pro Leu Gly Pro Thr Gln Gly Val Gly Phe Ala
280 285 290

Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser Pro Val Gln Asp His Thr
295 300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Gly Ile Ile Ser Ile
330 335 340

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Ala Pro Leu Ser Thr Thr
345 350 355

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ser Ala Trp Thr
360 365 370

Val Pro Phe Ala Ser Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
375 380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
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Cys Phe Ala
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35 40 45

Ser Pro Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
50 55 60

Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Gln
65 70 75 80

Arg His Gly Ala Arg Phe Pro Thr Ser Gly Ala Ala Thr Arg Ile Ser
85 90 95

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
100 105 110

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
115 120 125

Val Pro Phe Gly Ala Asn Gln Ser Ser Gln Ala Gly Ile Lys Phe Tyr
130 135 140

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala

145 150 155 160

Ser Gly Ser Asp Arg Val Ile Asp Ser Ala Thr Asn Trp Ile Glu Gly
165 170 175

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
180 185 190

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
195 200 205

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Glu Leu Gly
210 215 220

Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
225 230 235 240

Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
245 250 255

Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
260 265 270

Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
275 280 285

Glu Trp Ile Gln Tyr Asp Tyr Leu Gly Asp Leu Asp Lys Tyr Tyr Gly
290 295 300

Thr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
305 310 315 320

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
325 330 335

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
340 345 350

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ala Ile
355 360 365

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
370 375 380

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Leu
385 390 395 400

Val Pro Phe Ser Ala Arg Met Tyr Val Glu Met Met Gln Cys Glu Ala
405 410 415

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
420 425 430

Leu His Gly Cys Gly Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
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Cys Phe Ala
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tatatgaatt cttaagcgaa ac 22

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ggtcaatact ctccattctt ctctttggaa g 31

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cacacgacaa caccatggtt tccatcttc 29

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acccttctta caaagcgaat tctatagata tat 33

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           -20                 -15                 -10

aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac tct tgt gac       96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
        -5              -1  1               5

act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct cac ttg tgg      144
Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10                  15                  20                  25

ggt acc tac tct cca tac ttc tct ttg gca gac gaa tct gct att tct      192
Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
                30                  35                  40

cca gac gtc cca aag gac tgt aga gtt act ttc gtt caa gtt ttg tct      240
Pro Asp Val Pro Lys Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
            45                  50                  55

aga cac ggt gct aga tac cca act tct tct aag tct aag gct tac tct      288
Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Ala Tyr Ser
        60                  65                  70

gct ttg att gaa gct att caa aag aac gct act gct ttc aag ggt aag      336
Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
    75                  80                  85

tac gct ttc ttg aag act tac aac tac act ttg ggt gct gac gac ttg      384
Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90                  95                  100                 105

act cca ttc ggt gaa aac caa atg gtt aac tct ggt att aag ttc tac      432
Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
                110                 115                 120

aga aga tac aag gct ttg gct aga aag att gtt cca ttc att aga gct      480
Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
            125                 130                 135

tct ggt tct gac aga gtt att gct tct gct gaa aag ttc att gaa ggt      528
Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
        140                 145                 150

ttc caa tct gct aag ttg gct gac cca ggt tct caa cca cac caa gct      576
Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
    155                 160                 165

tct cca gtt att aac gtg atc att cca gaa gga tcc ggt tac aac aac      624
Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
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170                 175                 180                 185

act ttg gac cat ggt ctt tgt act gct ttc gaa gac tct acc cta ggt      672
Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Asp Ser Thr Leu Gly
                190                 195                 200

gac gac gtt gaa gct aac ttc act gct ttg ttc gct cca gct att aga      720
Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
            205                 210                 215

gct aga ttg gaa gct gac ttg cca ggt gtt act ttg act gac gaa gac      768
Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
        220                 225                 230

gtt gtt tac ttg atg gac atg tgt cca ttc gac act gtc gct aga act      816
Val Val Tyr Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
    235                 240                 245

tct gac gct act gaa ttg tct cca ttc tgt gct ttg ttc act cac gac      864
Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250                 255                 260                 265

gaa tgg atc caa tac gac tac ttg caa agc ttg ggt aag tac tac ggt      912
Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
                270                 275                 280

tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt ggt ttc gct      960
Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
            285                 290                 295

aac gaa ttg att gct aga ttg act cac tct cca gtt caa gac cac act     1008
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
        300                 305                 310

tct act aac cac act ttg gac tct aac cca gct act ttc cca ttg aac     1056
Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
    315                 320                 325

gct act ttg tac gct gac ttc tct cac gac aac act atg ata tct att     1104
Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Ile Ser Ile
330                 335                 340                 345

ttc ttc gct ttg ggt ttg tac aac ggt acc aag cca ttg tct act act     1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
                350                 355                 360

tct gtt gaa tct att gaa gaa act gac ggt tac tct gct tct tgg act     1200
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
            365                 370                 375

gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa tgt caa gct     1248
Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
        380                 385                 390

gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga gtt gtt cca     1296
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
    395                 400                 405

ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag aga gac gac     1344
Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410                 415                 420                 425
```

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ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac tgg gct gaa     1392
Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
                430                 435                 440

tgt ttc gct taa                                                  1404
Cys Phe Ala
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<210> 91
<211> 467
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<220>
<223> Primer

<400> 91

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Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
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        -5              -1  1               5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10                  15                  20                  25

Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
                30                  35                  40

Pro Asp Val Pro Lys Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
            45                  50                  55

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Ala Tyr Ser
        60                  65                  70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
    75                  80                  85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90                  95                  100                 105

Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
                110                 115                 120

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
            125                 130                 135

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
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```
        140                 145                 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
    155                 160                 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
170                 175                 180                 185

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Asp Ser Thr Leu Gly
                190                 195                 200

Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
            205                 210                 215

Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
        220                 225                 230

Val Val Tyr Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
    235                 240                 245

Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250                 255                 260                 265

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
                270                 275                 280

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
            285                 290                 295

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
        300                 305                 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
    315                 320                 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Ile Ser Ile
330                 335                 340                 345

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
                350                 355                 360

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
            365                 370                 375

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
        380                 385                 390
```

```
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
    395                 400                 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410                 415                 420                 425

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
                430                 435                 440

Cys Phe Ala
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<210> 92
<211> 1404
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Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
            -20                 -15                 -10

aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac tct tgt gac       96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
        -5              -1  1               5

act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct cac ttg tgg      144
Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10                  15                  20                  25

ggt acc tac tct cca tac ttc tct ttg gca gac gaa tct gct att tct      192
Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
                30                  35                  40
```

```
cca gac gtc cca aag gac tgt aga gtt act ttc gtt caa gtt ttg tct      240
Pro Asp Val Pro Lys Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
            45                  50                  55

aga cac ggt gct aga tac cca act tct tct gcg tct aag gct tac tct      288
Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
        60                  65                  70

gct ttg att gaa gct att caa aag aac gct act gct ttc aag ggt aag      336
Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
    75                  80                  85

tac gct ttc ttg aag act tac aac tac act ttg ggt gct gac gac ttg      384
Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90                  95                  100                 105

act cca ttc ggt gaa aac caa atg gtt aac tct ggt att aag ttc tac      432
Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
                110                 115                 120

aga aga tac aag gct ttg gct aga aag att gtt cca ttc att aga gct      480
Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
            125                 130                 135

tct ggt tct gac aga gtt att gct tct gct gaa aag ttc att gaa ggt      528
Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
        140                 145                 150

ttc caa tct gct aag ttg gct gac cca ggt tct caa cca cac caa gct      576
Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
    155                 160                 165

tct cca gtt att aac gtg atc att cca gaa gga tcc ggt tac aac aac      624
Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
170                 175                 180                 185

act ttg gac cat ggt ctt tgt act gct ttc gaa gac tct acc cta ggt      672
Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Asp Ser Thr Leu Gly
                190                 195                 200

gac gac gtt gaa gct aac ttc act gct ttg ttc gct cca gct att aga      720
Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
            205                 210                 215

gct aga ttg gaa gct gac ttg cca ggt gtt act ttg act gac gaa gac      768
Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
        220                 225                 230

gtt gtt tac ttg atg gac atg tgt cca ttc gac act gtc gct aga act      816
Val Val Tyr Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
    235                 240                 245

tct gac gct act gaa ttg tct cca ttc tgt gct ttg ttc act cac gac      864
Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250                 255                 260                 265

gaa tgg atc caa tac gac tac ttg caa agc ttg ggt aag tac tac ggt      912
Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
                270                 275                 280

tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt ggt ttc gct      960
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Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
            285                 290                 295

aac gaa ttg att gct aga ttg act cac tct cca gtt caa gac cac act     1008
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
        300                 305                 310

tct act aac cac act ttg gac tct aac cca gct act ttc cca ttg aac     1056
Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
    315                 320                 325

gct act ttg tac gct gac ttc tct cac gac aac act atg ata tct att     1104
Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Ile Ser Ile
330                 335                 340                 345

ttc ttc gct ttg ggt ttg tac aac ggt acc aag cca ttg tct act act     1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
                350                 355                 360

tct gtt gaa tct att gaa gaa act gac ggt tac tct gct tct tgg act     1200
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
            365                 370                 375

gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa tgt caa gct     1248
Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
        380                 385                 390

gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga gtt gtt cca     1296
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
    395                 400                 405

ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag aga gac gac     1344
Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410                 415                 420                 425

ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac tgg gct gaa     1392
Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
                430                 435                 440

tgt ttc gct taa                                                    1404
Cys Phe Ala
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<210> 93
<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 93

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            -20                 -15                 -10

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
        -5              -1  1               5
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Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10 15 20 25

Gly Thr Tyr Ser Pro Tyr Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
30 35 40

Pro Asp Val Pro Lys Asp Cys Arg Val Thr Phe Val Gln Val Leu Ser
45 50 55

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
60 65 70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
75 80 85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90 95 100 105

Thr Pro Phe Gly Glu Asn Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
110 115 120

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
125 130 135

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ser Gln Pro His Gln Ala
155 160 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ser Gly Tyr Asn Asn
170 175 180 185

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Asp Ser Thr Leu Gly
190 195 200

Asp Asp Val Glu Ala Asn Phe Thr Ala Leu Phe Ala Pro Ala Ile Arg
205 210 215

Ala Arg Leu Glu Ala Asp Leu Pro Gly Val Thr Leu Thr Asp Glu Asp
220 225 230

Val Val Tyr Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys Ala Leu Phe Thr His Asp
250 255 260 265

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
270 275 280

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Ala
285 290 295

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Ile Ser Ile
330 335 340 345

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
350 355 360

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
365 370 375

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Gln Ala
380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420 425

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Ala Glu
430 435 440

Cys Phe Ala

<210> 94
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<221> sig_peptide
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<223>

<400> 94

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atg ggc gtg ttc gtc gtg cta ctg tcc att gcc acc ttg ttc ggt tcc       48
Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
            -20                 -15                 -10

aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac tct tgt gac       96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
        -5              -1  1               5

act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct cac ttg tgg      144
Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10                  15                  20                  25

ggt aca tac tct cca ttc ttc tct ttg gct gac gaa tct gct att tct      192
Gly Thr Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
                30                  35                  40

cca gac gtt cca aag ggt tgt aga gtt act ttc gtt caa gtt ttg tct      240
Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
            45                  50                  55

aga cac ggt gct aga tac cca act tct tct aag tct aag gct tac tct      288
Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Ala Tyr Ser
        60                  65                  70

gct ttg att gaa gct att caa aag aac gct act gct ttc aag ggt aag      336
Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
    75                  80                  85

tac gct ttc ttg aag act tac aat tac act ttg ggt gct gac gac ttg      384
Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90                  95                  100                 105

act cca ttc ggt gaa caa caa atg gtt aac tct ggt att aag ttc tac      432
Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
                110                 115                 120

aga aga tac aag gct ttg gct aga aag att gtt cca ttc att aga gct      480
Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
            125                 130                 135

tct ggt tct gac aga gtt att gct tct gcc gaa aag ttc att gaa ggt      528
Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
        140                 145                 150
```

```
ttc caa tct gct aag ttg gct gac cca ggt gct aac cca cac caa gct      576
Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
    155                 160                 165

tct cca gtt att aac gtt att att cca gaa ggt gct ggt tac aac aac      624
Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
170                 175                 180                 185

act ttg gac cac ggt ttg tgt act gct ttc gaa gaa tct acc cta ggt      672
Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Thr Leu Gly
                190                 195                 200

gac gac gtt gaa gct aac ttc act gct gtt ttc gct cca cca att aga      720
Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
            205                 210                 215

gct aga ttg gaa gct cac ttg cca ggt gtt aac ttg act gac gaa gac      768
Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
        220                 225                 230

gtt gtt aac ttg atg gac atg tgt cca ttc gac act gtt gct aga act      816
Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
    235                 240                 245

tct gac gct act caa ttg tct cca ttc tgt gac ttg ttc act cac gac      864
Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
250                 255                 260                 265

gaa tgg att caa tac gac tac ttg caa tct ttg ggt aag tac tac ggt      912
Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
                270                 275                 280

tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt ggt ttc gtt      960
Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
            285                 290                 295

aac gaa ttg att gct aga ttg act cac tct cca gtt caa gac cac act     1008
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
        300                 305                 310

tct act aac cac act ttg gac tct aac cca gct act ttc cca ttg aac     1056
Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
    315                 320                 325

gct act ttg tac gct gac ttc tct cac gac aac act atg gtt tct att     1104
Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
330                 335                 340                 345

ttc ttc gct ttg ggt ttg tac aac ggt act aag cca ttg tct act act     1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
                350                 355                 360

tct gtt gaa tct att gaa gaa act gac ggt tac tct gct tct tgg act     1200
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
            365                 370                 375

gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa tgt gaa gct     1248
Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
        380                 385                 390
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```
gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga gtt gtt cca     1296
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
    395                 400                 405

ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag aga gac gac     1344
Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410                 415                 420                 425

ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac tgg gaa gaa     1392
Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu
                430                 435                 440

tgt ttc gct taa                                                   1404
Cys Phe Ala
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<210> 95
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<400> 95

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            -20                 -15                 -10

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
        -5              -1  1               5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10                  15                  20                  25

Gly Thr Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
                30                  35                  40

Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
            45                  50                  55

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Lys Ser Lys Ala Tyr Ser
        60                  65                  70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
    75                  80                  85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90                  95                  100                 105

Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
                110                 115                 120
```

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
125 130 135

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
155 160 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
170 175 180 185

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Thr Leu Gly
190 195 200

Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
205 210 215

Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
220 225 230

Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
250 255 260 265

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
270 275 280

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
285 290 295

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
330 335 340 345

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
350 355 360

```
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
            365                 370                 375

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
        380                 385                 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
    395                 400                 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410                 415                 420                 425

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu
                430                 435                 440

Cys Phe Ala
```

<210> 96
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<222> (1)..(1401)
<223>

<220>
<221> mat_peptide
<222> (70)..()
<223>

<400> 96

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atg ggc gtg ttc gtc gtg cta ctg tcc att gcc acc ttg ttc ggt tcc       48
Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
            -20                 -15                 -10

aca tcc ggt acc gcc ttg ggt cct cgt ggt aat tct cac tct tgt gac       96
Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
        -5              -1  1               5

act gtt gac ggt ggt tac caa tgt ttc cca gaa att tct cac ttg tgg      144
```

```
Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10                  15                  20                  25

ggt aca tac tct cca ttc ttc tct ttg gct gac gaa tct gct att tct      192
Gly Thr Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
                30                  35                  40

cca gac gtt cca aag ggt tgt aga gtt act ttc gtt caa gtt ttg tct      240
Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
            45                  50                  55

aga cac ggt gct aga tac cca act tct tct gcg tct aag gct tac tct      288
Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
        60                  65                  70

gct ttg att gaa gct att caa aag aac gct act gct ttc aag ggt aag      336
Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
    75                  80                  85

tac gct ttc ttg aag act tac aat tac act ttg ggt gct gac gac ttg      384
Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90                  95                  100                 105

act cca ttc ggt gaa caa caa atg gtt aac tct ggt att aag ttc tac      432
Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
                110                 115                 120

aga aga tac aag gct ttg gct aga aag att gtt cca ttc att aga gct      480
Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
            125                 130                 135

tct ggt tct gac aga gtt att gct tct gcc gaa aag ttc att gaa ggt      528
Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
        140                 145                 150

ttc caa tct gct aag ttg gct gac cca ggt gct aac cca cac caa gct      576
Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
    155                 160                 165

tct cca gtt att aac gtt att att cca gaa ggt gct ggt tac aac aac      624
Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
170                 175                 180                 185

act ttg gac cac ggt ttg tgt act gct ttc gaa gaa tct acc cta ggt      672
Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Thr Leu Gly
                190                 195                 200

gac gac gtt gaa gct aac ttc act gct gtt ttc gct cca cca att aga      720
Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
            205                 210                 215

gct aga ttg gaa gct cac ttg cca ggt gtt aac ttg act gac gaa gac      768
Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp
        220                 225                 230

gtt gtt aac ttg atg gac atg tgt cca ttc gac act gtt gct aga act      816
Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
    235                 240                 245

tct gac gct act caa ttg tct cca ttc tgt gac ttg ttc act cac gac      864
Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
```

```
250                 255                 260                 265

gaa tgg att caa tac gac tac ttg caa tct ttg ggt aag tac tac ggt      912
Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
                270                 275                 280

tac ggt gct ggt aac cca ttg ggt cca gct caa ggt gtt ggt ttc gtt      960
Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
            285                 290                 295

aac gaa ttg att gct aga ttg act cac tct cca gtt caa gac cac act     1008
Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
        300                 305                 310

tct act aac cac act ttg gac tct aac cca gct act ttc cca ttg aac     1056
Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
    315                 320                 325

gct act ttg tac gct gac ttc tct cac gac aac act atg gtt tct att     1104
Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
330                 335                 340                 345

ttc ttc gct ttg ggt ttg tac aac ggt act aag cca ttg tct act act     1152
Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
                350                 355                 360

tct gtt gaa tct att gaa gaa act gac ggt tac tct gct tct tgg act     1200
Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
            365                 370                 375

gtt cca ttc gct gct aga gct tac gtt gaa atg atg caa tgt gaa gct     1248
Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
        380                 385                 390

gaa aag gaa cca ttg gtt aga gtt ttg gtt aac gac aga gtt gtt cca     1296
Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
    395                 400                 405

ttg cac ggt tgt gct gtt gac aag ttg ggt aga tgt aag aga gac gac     1344
Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410                 415                 420                 425

ttc gtt gaa ggt ttg tct ttc gct aga tct ggt ggt aac tgg gaa gaa     1392
Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu
                430                 435                 440

tgt ttc gct taa                                                   1404
Cys Phe Ala
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<210> 97
<211> 467
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 97

Met Gly Val Phe Val Val Leu Leu Ser Ile Ala Thr Leu Phe Gly Ser
-20 -15 -10

Thr Ser Gly Thr Ala Leu Gly Pro Arg Gly Asn Ser His Ser Cys Asp
-5 -1 1 5

Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro Glu Ile Ser His Leu Trp
10 15 20 25

Gly Thr Tyr Ser Pro Phe Phe Ser Leu Ala Asp Glu Ser Ala Ile Ser
30 35 40

Pro Asp Val Pro Lys Gly Cys Arg Val Thr Phe Val Gln Val Leu Ser
45 50 55

Arg His Gly Ala Arg Tyr Pro Thr Ser Ser Ala Ser Lys Ala Tyr Ser
60 65 70

Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala Thr Ala Phe Lys Gly Lys
75 80 85

Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr Leu Gly Ala Asp Asp Leu
90 95 100 105

Thr Pro Phe Gly Glu Gln Gln Met Val Asn Ser Gly Ile Lys Phe Tyr
110 115 120

Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile Val Pro Phe Ile Arg Ala
125 130 135

Ser Gly Ser Asp Arg Val Ile Ala Ser Ala Glu Lys Phe Ile Glu Gly
140 145 150

Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly Ala Asn Pro His Gln Ala
155 160 165

Ser Pro Val Ile Asn Val Ile Ile Pro Glu Gly Ala Gly Tyr Asn Asn
170 175 180 185

Thr Leu Asp His Gly Leu Cys Thr Ala Phe Glu Glu Ser Thr Leu Gly
190 195 200

Asp Asp Val Glu Ala Asn Phe Thr Ala Val Phe Ala Pro Pro Ile Arg
205 210 215

Ala Arg Leu Glu Ala His Leu Pro Gly Val Asn Leu Thr Asp Glu Asp

220 225 230

Val Val Asn Leu Met Asp Met Cys Pro Phe Asp Thr Val Ala Arg Thr
235 240 245

Ser Asp Ala Thr Gln Leu Ser Pro Phe Cys Asp Leu Phe Thr His Asp
250 255 260 265

Glu Trp Ile Gln Tyr Asp Tyr Leu Gln Ser Leu Gly Lys Tyr Tyr Gly
270 275 280

Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala Gln Gly Val Gly Phe Val
285 290 295

Asn Glu Leu Ile Ala Arg Leu Thr His Ser Pro Val Gln Asp His Thr
300 305 310

Ser Thr Asn His Thr Leu Asp Ser Asn Pro Ala Thr Phe Pro Leu Asn
315 320 325

Ala Thr Leu Tyr Ala Asp Phe Ser His Asp Asn Thr Met Val Ser Ile
330 335 340 345

Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr Lys Pro Leu Ser Thr Thr
350 355 360

Ser Val Glu Ser Ile Glu Glu Thr Asp Gly Tyr Ser Ala Ser Trp Thr
365 370 375

Val Pro Phe Ala Ala Arg Ala Tyr Val Glu Met Met Gln Cys Glu Ala
380 385 390

Glu Lys Glu Pro Leu Val Arg Val Leu Val Asn Asp Arg Val Val Pro
395 400 405

Leu His Gly Cys Ala Val Asp Lys Leu Gly Arg Cys Lys Arg Asp Asp
410 415 420 425

Phe Val Glu Gly Leu Ser Phe Ala Arg Ser Gly Gly Asn Trp Glu Glu
430 435 440

Cys Phe Ala

<210> 98
<211> 441

<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic

<400> 98

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Asn Ser His Ser Cys Asp Thr Val Asp Gly Gly Tyr Gln Cys Phe Pro
1               5                  10                  15

Glu Ile Ser His Leu Trp Gly Gln Tyr Ser Pro Tyr Phe Ser Leu Glu
            20                  25                  30

Asp Glu Ser Ala Ile Ser Pro Asp Val Pro Asp Asp Cys Arg Val Thr
        35                  40                  45

Phe Val Gln Val Leu Ser Arg His Gly Ala Arg Tyr Pro Thr Ser Ser
    50                  55                  60

Lys Ser Lys Ala Tyr Ser Ala Leu Ile Glu Ala Ile Gln Lys Asn Ala
65                  70                  75                  80

Thr Ala Phe Lys Gly Lys Tyr Ala Phe Leu Lys Thr Tyr Asn Tyr Thr
                85                  90                  95

Leu Gly Ala Asp Asp Leu Thr Pro Phe Gly Glu Asn Gln Met Val Asn
            100                 105                 110

Ser Gly Ile Lys Phe Tyr Arg Arg Tyr Lys Ala Leu Ala Arg Lys Ile
        115                 120                 125

Val Pro Phe Ile Arg Ala Ser Gly Ser Asp Arg Val Ile Ala Ser Ala
    130                 135                 140

Glu Lys Phe Ile Glu Gly Phe Gln Ser Ala Lys Leu Ala Asp Pro Gly
145                 150                 155                 160

Ser Gln Pro His Gln Ala Ser Pro Val Ile Asp Val Ile Ile Pro Glu
                165                 170                 175

Gly Ser Gly Tyr Asn Asn Thr Leu Asp His Gly Thr Cys Thr Ala Phe
            180                 185                 190

Glu Asp Ser Glu Leu Gly Asp Asp Val Glu Ala Asn Phe Thr Ala Leu
        195                 200                 205

Phe Ala Pro Ala Ile Arg Ala Arg Leu Glu Ala Asp Leu Pro Gly Val
```

B4

```
    210                 215                 220

Thr Leu Thr Asp Glu Asp Val Val Tyr Leu Met Asp Met Cys Pro Phe
225                 230                 235                 240

Glu Thr Val Ala Arg Thr Ser Asp Ala Thr Glu Leu Ser Pro Phe Cys
                245                 250                 255

Ala Leu Phe Thr His Asp Glu Trp Arg Gln Tyr Asp Tyr Leu Gln Ser
            260                 265                 270

Leu Gly Lys Tyr Tyr Gly Tyr Gly Ala Gly Asn Pro Leu Gly Pro Ala
        275                 280                 285

Gln Gly Val Gly Phe Ala Asn Glu Leu Ile Ala Arg Leu Thr Arg Ser
    290                 295                 300

Pro Val Gln Asp His Thr Ser Thr Asn His Thr Leu Asp Ser Asn Pro
305                 310                 315                 320

Ala Thr Phe Pro Leu Asn Ala Thr Leu Tyr Ala Asp Phe Ser His Asp
                325                 330                 335

Asn Ser Met Ile Ser Ile Phe Phe Ala Leu Gly Leu Tyr Asn Gly Thr
            340                 345                 350

Ala Pro Leu Ser Thr Thr Ser Val Glu Ser Ile Glu Glu Thr Asp Gly
        355                 360                 365

Tyr Ser Ala Ser Trp Thr Val Pro Phe Gly Ala Arg Ala Tyr Val Glu
    370                 375                 380

Met Met Gln Cys Gln Ala Glu Lys Glu Pro Leu Val Arg Val Leu Val
385                 390                 395                 400

Asn Asp Arg Val Val Pro Leu His Gly Cys Ala Val Asp Lys Leu Gly
                405                 410                 415

Arg Cys Lys Arg Asp Asp Phe Val Glu Gly Leu Ser Phe Ala Arg Ser
            420                 425                 430

Gly Gly Asn Trp Ala Glu Cys Phe Ala
        435                 440
```

Concluded